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NITROGEN RETENTION IN CHRONIC INTERSTITIAL NEPHRITIS AND ITS SIGNIFICANCE *

HILDING BERGLUND, M.D.

BOSTON

Facing the problem of kidney function, we are accustomed to consider mainly the purely excretory function in the strictest sense of the word; that is the passing over of a definite substance from one side of the kidney filtrum, from the blood, to the other side, the urine. This is equally true in health and in disease, and it forms the basis for most of the work hitherto carried out.

It must be remembered, however, that the kidney is not only a filtration apparatus but it acts also as a delicate chemical laboratory. Schmiedeberg,[1] in 1876, discovered the synthesis of hippuric acid from glycocoll and benzoic acid as a function of the kidney. According to the present day conception, this synthesis is not localized exclusively in this organ. It is interesting to note that this process as a kidney function test has recently been drawn into the field of clinical research, by Kingsbury.[2]

Another important chemical function necessarily localized in the kidney is the regulation of the reaction of the urine. From the constant slightly alkaline plasma, a urine is extracted which, compared with the plasma, may have in one hour a considerable alkalinity, and in another hour an even more marked acid reaction. The interesting point here is that when the urine is formed we have a change from the buffer system of the blood, the bicarbonate-carbon dioxid system, to a quite new buffer system of the urine, the phosphate mixture system. Benedict's [3] hypothesis concerning the ammonia formation in the kidney may be looked on from a somewhat related point of view.

We know very little about how these interesting processes of the kidney are affected in acute and chronic nephritis. In spite of pioneer work by Michaelis, Palmer and Henderson, and Peabody, carried out on twenty-four hour urines mostly, this field has not yet proved mature for clinical studies. First, we need to have the physiologic side of the problem thoroughly worked out. Moreover, there is little reason to believe that our knowledge of further chemical processes occurring in the kidney will not be increased in the future.

Returning to what I may call the purely excretory function of the kidney, we know that, among the main branches of metabolism, the kidney is engaged chiefly in removing the end-products of the protein metabolism. As far as the nitrogen elimination is concerned, we are dealing with, clinically, the most extensively and the most successfully studied field of kidney function. The removal of the end-products of protein metabolism includes, of course, the excretion of salts. When I mention especially the elimination of sulphates, it is only to point out that we here meet again a chapter on kidney function, the study of which, in pathologic conditions, is practically untouched.

While dealing with these as yet relatively little or not at all studied phases of kidney function, let me point out that it is not only in the diabetic person that the kidney is engaged in the excretion of products from the carbohydrate metabolism; on the contrary, in the glycuresis following every mixed meal, everybody excretes a little of unusable sugars and even polysaccharids. How these compounds are taken care of in cases of badly impaired kidney function, we certainly do not know—just as we do not know the significance of the high blood sugar level without diabetes, frequently reported in similar cases.

THE NITROGEN RETENTION

As a diagnostically and prognostically valuable phenomenon, only the disturbances in nitrogen elimination have yet been fruitful. In cases of nephritis, it was, of course, most natural to study nitrogen retention in the same medium in which you studied casts and output of albumin; but the tedious affair of a classic metabolic experiment covering from eight to fourteen days, as pointed out by von Noorden [4] in 1892, excluded completely a more extensive use, especially in days when a metabolism ward in a hospital was a most rare finding.

In 1902, Strauss [5] determined the nonprotein nitrogen of the blood serum, boiling it with acetic acid for the removal of the proteins. His conception of the determined nitrogen is that of "retained nitrogen," a definition based rather on the pathologic than on the normal findings; and he proved, in an extensive study, the increase of the retained nitrogen in different stages and in different groups of nephritis. Strauss' figures for the normal content of the retained nitrogen have

* Read before the Section on Urology at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.

* From the Biochemical Laboratory, Harvard University Medical School, and the medical service of the Peter Bent Brigham Hospital.

1. Bunge, G., and Schmiedeberg, O.: Arch. f. exper. Path. u. Pharmokol. **6**: 233, 1876-1877.

2. Kingsbury, F. B., and Swanson, W. W.: Synthesis and Elimination of Hippuric Acid in Nephritis, Arch. Int. Med. **28**: 220 (Aug.) 1921.

3. Nash, T. P., Jr., and Benedict, S. R.: J. Biol. Chem. **48**: 463 (Oct.) 1921.

4. Von Noorden, C.: Beiträge zur Lehre von Stoffwechsel **1**: 118, 1892.

5. Strauss, H.: Die chronischen Nierenentzündungen, Berlin, Hirschfield, 1902; Berl. klin. Wchnschr. **39**: 536, 1902.

been, in the main, confirmed by later work with more perfect methods. This is not true for Strauss' figures for uric acid and ammonia.

There seem to have been two different factors working together, causing a delay of more than ten years, before this important step, taken by Strauss really became practically fruitful in the clinic of the diseases of the kidney. First, the methods were fairly laborious; second, before the works of Löehlein, F. Müller and especially Volhard and Fahr, there was no satisfactory classification of the different types of chronic interstitial nephritis, no way out from a puzzling mix up of interstitial and parenchymatous nephritis, of chronic hypertension of quite different genesis.

The methodological improvements, at least in this country, are closely correlated to the work of Folin and Denis,[6] begun from a quite different point of view and for another purpose in 1912. The later rapid outgrow of Folin's[7] system of blood analysis up to the very latest months has finally made possible a fairly comprehensive survey of the nonprotein nitrogen in its different constituents, in both blood and plasma.

Therefore, it seems more practical to omit at this time—without any underestimation of a great amount of earlier important work carried out both in this country and abroad—any detailed dealing with earlier figures, and instead to present some figures recently obtained in Folin's laboratory.

TABLE 1.—NORMAL MINIMUM, MAXIMUM AND AVERAGE BLOOD CONTENT OF NONPROTEIN NITROGENOUS PRODUCTS (FROM TWELVE YOUNG MEN)

	Whole Blood per 100 C.c.				Plasma per 100 C.c.				Corpuscles per 100 C.c.			
After a Night's Fast	Amino-acid Nitrogen, Mg.	Urea Nitrogen, Mg.	Undetermined Residual Nitrogen, Mg.	Total Nonprotein Nitrogen, Mg.	Amino-acid Nitrogen, Mg.	Urea Nitrogen, Mg.	Undetermined Residual Nitrogen, Mg.	Total Nonprotein Nitrogen, Mg.	Amino-acid Nitrogen, Mg.	Urea Nitrogen, Mg.	Undetermined Residual Nitrogen, Mg.	Total Nonprotein Nitrogen, Mg.
Minimum	5.7	8.9	10.1	27.8	4.3	9.6	1.8	18.0	6.7	7.7	18.3	37.7
Maximum	7.8	15.2	17.5	39.4	6.2	17.3	11.5	30.0	10.7	13.2	33.8	55.0
Average	6.4	11.5	13.7	32.1	5.3	12.4	6.7	24.7	8.2	10.3	24.7	43.6

THE NORMAL NONPROTEIN NITROGEN

Considering the nonprotein nitrogen of the blood or plasma from a chemical standpoint, we recognize at once that it consists necessarily of a mixture of quite different compounds. Our present day knowledge of the general course of protein metabolism permits us to divide this variety of compounds schematically into two groups: those engaged in the building up or maintenance of the organism, in the anabolic processes, and those which represent the final or perhaps even the intermediate stages of the catabolic processes.

TABLE 2.—THE PARTITION OF CREATIN AND CREATININ BETWEEN PLASMA AND CORPUSCLES (NORMAL MEN)

	Whole Blood per 100 C.c.		Plasma per 100 C.c.		Corpuscles per 100 C.c.	
Fasting	Creatin, Mg.	Creatinin, Mg.	Creatin, Mg.	Creatinin, Mg.	Creatin, Mg.	Creatinin, Mg.
Minimum	...	....	0.5	....	...	....
Average	3.5	1.16	1.6	1.17	6.1	1.17
Maximum	...	....	3.0	....	...	....

The demarcation of the former group, the free amino-acids, in the direction upward to larger molecules of peptid character, is of course not absolutely sharp, and it depends on the way of carrying out the precipitation of the proteins. Among the more commonly used methods, the precipitation with tungstic acid, according to Folin and Wu, or with heavy metal salts, such as mercuric chlorid, gives the smallest amount of these higher compounds.

The compounds of the latter group, including the unusable end-products of protein metabolism, attract the greater interest from the point of view of kidney function. Besides the urea, of whose character the end-product there is certainly no doubt, the uric acid and the creatinin have especially been studied. Tables 1 and 2 contain normal figures alone. I shall deal briefly with each of the different compounds.

Before direct methods for estimating the amino-acids in blood were available, several attempts were made to estimate the amino-nitrogen fraction of the nonprotein nitrogen by subtracting the urea nitrogen from the total nonprotein nitrogen. The direct determination of the amino-acid nitrogen, consistently giving considerably lower figures both with the Van Slyke method and with the recent method of Folin, has proved the unreliability of this indirect method of calculation. The plasma figures for the amino-acid nitrogen, fairly constant in the morning after the night's fast, show a small increase after each protein-containing meal, an increase that, after a large dose of gelatin, for instance, is taken, can reach 100 per cent.

The urea nitrogen figures show a similar behavior, with a difference in time, that, from the standpoint of the course of deamination, is of considerable interest. The top of the increase of the urea nitrogen after a meal comes much later than the peak of the amino-acids, about five to seven hours after the meal is taken, and is accompanied by a rapid return of the amino-acids to the starting level.

Turning to the creatinin figures, an interesting question is: What do the normal figures for the preformed creatinin really mean? The normal figures are always, when pure picric acid is used and the determination is carried out within a couple of hours after the blood was drawn, very low, about 1.0 to 1.3 mg. per hundred cubic centimeters of whole blood or plasma. Considering that the composition of the undetermined rest of the nonprotein nitrogen is unknown—a conception that I will discuss later—it may, of course, be admitted that possibly other compounds than creatinin, even under the conditions used in the method, may reduce the picric acid.

Benedict[8] certainly applies this criticism to the limit when he denies the presence of any creatinin at all in the blood. It, however, seems doubtful whether such a question ever can be definitely settled by strictly chemical work; that is, by isolation and identification.

6. Folin, O., and Denis, W.: J. Biol. Chem. **11**: 89, 1912.
7. Folin, O.: J. Biol. Chem. **51**: 377 (April) 1922.
8. Behre, J. A., and Benedict, S. R.: J. Biol. Chem. **52**: 11 (May) 1922.

This easily brings up the question of the value and reliability of the present blood chemistry as a whole. The situation is here an interesting one. A few years ago, a leading chemist (Abderhalden) still denied the presence of amino-acids in the blood, and at about the same time the first reliable quantitative determination of the uric acid in blood (by Folin) created an epoch in the history of blood chemistry. Today, we are using a comprehensive system and require methods accurate enough for a summarizing of the different compounds and a consequent comparison of the summary with the total nonprotein nitrogen. We do not even fear to calculate the amounts present in the corpuscles from the three factors: whole blood, plasma and corpuscles volume; all this not only as a play: we are trying to use the figures obtained in this way for a more intimate study of different physiologic and clinical problems. In the stress so put on the chemical methods, the physiologic experiment has been used and must be used as an auxiliary remedy. This is just the situation concerning the blood creatinin. A few such experiments are recorded in Table 3. The figures clearly demonstrate that the taking of pure creatinin by mouth in doses of from 1 to 10 gm. is followed by a fairly proportional increase of the creatinin in the blood, and this rise by a corresponding but less proportional increase of the creatinin output.[9]

The experiments do not, of course, give any definite information about the presence of creatinin in normal blood; but they prove, in a conclusive way, that creatinin is easily accumulated in the blood, in fact, much more easily than any other compound with which I have been working. The difference between creatinin and creatin in this respect is outstanding, as shown by a comparison with Tables 4, 5 and 6; and the same is true in comparison with amino-acids, sugars, chlorids, uric acid and even urea. The taking of only 1 gm. of creatinin by mouth, less than half of the amount normally excreted by the subject in the experiment in the course of twenty-four hours, sufficed to raise the blood creatinin 100 per cent., and 10 gm. of creatinin, corresponding to five days urine retention, increased the blood creatinin nearly 800 per cent. If the creatinin is to be considered as a definite end-product in the human organism that cannot be further metabolized, certainly there is no reason to doubt its accumulation in the blood in cases of impaired kidney function.

I have just mentioned the creatin. From a metabolic standpoint, it certainly belongs to the anabolic nonprotein compounds, just as it normally does not appear in the urine of the adult. Usually, in the papers, it is given together with the preformed creatinin as total creatinin. If we felt uncertain about the normal creatinin figures, we ought to be much more so about the creatin. We notice in Table 2 the much higher figures in the corpuscles than in the plasma; and, furthermore, we notice the considerable range of variation of the normal figures in the plasma.

If we assume that creatin normally is present in the plasma to any appreciable extent, we need at the same time to assume the existence of a renal threshold for creatin, since it does not normally appear in the urine. The assimilation limit for creatin of the human organism is well known to be very low, even on a carbohydrate-rich diet being less than 4 gm. to an adult. A thorough examination of Tables 4, 5 and 6 will show, however, that the taking of pure creatin by mouth in doses of 4 gm. is sooner or later followed by an increase in the creatin figures of the plasma: the smallest appreciable increase of the creatin in the plasma is accompanied by a creatin output in the urine, and this does occur without any relationship to the absolute height of the "creatin" level.

These findings may be summarized thus: There is no reason to assume the existence of anything like a renal threshold for creatin but there is very much reason to doubt the presence of any creatin at all in the normal plasma of the adult.

Concerning the uric acid, finally, I think the chemical determination does give much safer information than

TABLE 3.—THE INCREASE OF THE BLOOD CREATININ AND THE CREATININ OUTPUT AFTER TAKING CREATININ BY MOUTH (H. B., AGED 33 YEARS, WEIGHT 90 KG.)

Time	Experimental Condition	Blood Creatinin per 100 C.c., Mg.	Urine per Hour: Volume, C.c.	Urine per Hour: Creatinin, Mg.	Comment
7/ 2/20	Creatinin-free diet	1.04	75	81	A 72-minute urine sample belongs to each sample of blood
7/10/20	After 1 gm. creatinin by mouth	2.27	26	250	
7/13/20	After 3 gm. creatinin, 1 *	2.5	29	427	
7/13/20	After 3 gm. creatinin, 2	2.12	96	582	
7/17/20	After 5 gm. creatinin	4.75	30	460	
7/21/20	After 10 gm. creatinin, 1	7.9	52	830	
7/21/20	After 10 gm. creatinin, 2	6.15	58	485	
7/22/20	After 10 gm. creatinin, 3	2.14	23	102	

* The figures 1, 2, 3 indicate the number of doses in which the substance was taken: in one dose, in two doses, in three doses.

TABLE 4.—INCREASE (LATE) OF THE PLASMA-CREATIN AND CORRESPONDING CREATIN OUTPUT CAUSED BY TAKING CREATIN (4 GM.), THE PLASMA-CREATIN REMAINING CONSTANT (MR. W., AGED 24, WEIGHT 70 KG.)

May 11, 1921	Whole Blood per 100 C.c.: Creatin, Mg.	Whole Blood per 100 C.c.: Creatinin, Mg.	Plasma per 100 C.c.: Creatin, Mg.	Plasma per 100 C.c.: Creatinin, Mg.	Corpuscles per 100 C.c.: Creatin, Mg.	Corpuscles per 100 C.c.: Creatinin, Mg.	Urine per Hour: Volume, C.c.	Urine per Hour: Creatin, Mg.	Urine per Hour: Creatinin, Mg.	Comment *
10:55 a. m.	3.4	1.1	1.9	1.1	4.9	1.1	42	0	73	
11:00 a. m.	...	...	...	...	...	...	...	..	..	Took 4 gm. of crystalline creatin + 200 gm. of glucose + 600 c.c. of water
11:52 a. m.	3.7	1.0	1.9	1.1	5.7	1.0				
12:00 m.	...	...	...	...	...	...	83	0	81	
1:08 p. m.	3.4	1.1	1.9	1.1	5.1	1.1				
1:15 p. m.	...	...	...	...	...	...	288	0	86	
3:00 p. m.	3.8	1.2	2.3	1.2	5.5	1.2				
3:05 p. m.	...	...	...	...	...	...	44	29	82	
4:35 p. m.	3.8	1.1	2.6	1.2	5.3	1.1				
4:44 p. m.	...	...	...	...	...	...	33	63	87	
5:50 p. m.	3.8	1.1	1.9	1.1	6.4	1.1				
6:00 p. m.	...	...	...	...	...	...	28	35	77	

* Fasting; urinated at 9:01 a. m.

9. Calculations according to Ambard, made at the time of the experiments, gave a lower "constant" than the "constant" for urea, that should have come out according to Ambard, and this "constant" showed considerable variations in the different determinations.

physiologic experiments dealing with the relationship between the concentration in blood or plasma and the excretion in the urine. Through the preliminary precipitation process of Folin and Wu, a complete proof was gained that the figures obtained in the determination of uric acid in the blood really do mean uric acid. The equal value of later methods using direct determination, either by S. R. Benedict's new arsenic reagent or with the harmless original Folin and Denis reagent, is, therefore, proved by their correspondence with this earlier method. Depending on the behavior of the uric acid in pathologic conditions, the determination of uric acid has to be carried out on the plasma rather than on whole blood. I am not prepared today to give definite figures for the normal uric acid content of the plasma, but I believe about 4 mg. per hundred cubic centimeters of plasma may be given as the upper normal limit.

TABLE 5.—INCREASE OF THE PLASMA-CREATIN AND A CORRESPONDING CREATIN OUTPUT CAUSED BY TAKING CREATIN (4 GM.), THE PLASMA-CREATIN REMAINING CONSTANT (H. B., AGED 34, WEIGHT 90 KG.)

	Whole Blood per 100 C.c.		Plasma per 100 C.c.		Corpuscles per 100 C.c.		Urine per Hour			
Time	Creatin, Mg.	Creatinin, Mg.	Creatin, Mg.	Creatinin, Mg.	Creatin, Mg.	Creatinin, Mg.	Volume, C.c.	Creatin, Mg.	Creatinin, Mg.	Comment *
June 27, 1921:										
11:57 a. m.	...	...	...	...	...	...	26	0	89	
1:00 p. m.	3.8	1.1	0.5	1.2	8.2	1.1				
1:10 p. m.	...	...	...	...	...	...	...	..	..	Took 4 gm. of crystalline creatin + 200 gm. of pure glucose + 500 c.c. of water
1:35 p. m.	4.2	1.1	1.2	1.2	8.4	1.1				
1:50 p. m.	...	...	...	...	...	...	40	0	101	
1:58 p. m.	3.8	1.2	0.9	1.2	7.9	1.2				
2:13 p. m.	...	...	...	...	...	...	36	0	103	
2:20 p. m.	4.4	1.2	1.4	1.2	8.5	1.2				
2:39 p. m.	...	...	...	...	...	...	52	18	166	
3:15 p. m.	4.7	1.2	2.3	1.2	8.5	1.2				
3:26 p. m.	...	...	...	...	...	...	35	77	103	
4:43 p. m.	5.3	1.2	2.8	1.2	9.2	1.2				
4:55 p. m.	...	...	...	...	...	...	35	168	109	
6:25 p. m.	4.6	1.2	2.3	1.2	8.1	1.2	...	...	...	Vegetable dinner at 7:30 p. m.
6:43 p. m.	...	...	...	...	...	...	33	142	106	
June 28:										
9:52 a. m.	...	...	...	...	...	...	27	14	95	Fasting
12:00 m.	...	...	...	...	...	...	20	3	83	Fasting

* Patient urinated at 8:57 a. m.; at 9:30 a. m. he had breakfast, including four eggs.

TABLE 6.—INCREASE (IMMEDIATE) OF THE PLASMA-CREATIN AND A CORRESPONDING CREATIN OUTPUT CAUSED BY TAKING CREATIN (4 GM.); THE PLASMA-CREATIN REMAINING CONSTANT (MR. G. P. R., AGED 23, WEIGHT 90 KG.)

	Whole Blood per 100 C.c.		Plasma per 100 C.c.		Corpuscles per 100 C.c.		Urine per Hour			
April, 1921	Creatin, Mg.	Creatinin, Mg.	Creatin, Mg.	Creatinin, Mg.	Creatin, Mg.	Creatinin, Mg.	Volume, C.c.	Creatin, Mg.	Creatinin, Mg.	Comment *
11:00 a. m.	3.8	1.1	3.0	1.1	5.0	1.1	72	0	99	
11:05 a. m.	...	...	...	...	...	...	...	..	..	Took 4 gm. of crystalline creatin + 300 c.c. of pre-digested casein (12 gm. nitrogen)
11:48 a. m.	5.0	1.1	3.2	1.1	7.4	1.1				
12:04 p. m.	...	...	...	...	...	...	51	53	92	
1:15 p. m.	6.1	1.1	6.3	1.1	6.0	1.1				
1:30 p. m.	...	...	...	...	...	...	88	421	112	Took 100 gm. of glucose at 1:45 p. m.
3:05 p. m.	5.5	1.0	3.8	1.1	7.7	1.0				
3:30 p. m.	...	...	...	...	...	...	80	176	105	
4:45 p. m.	4.5	1.1	3.6	1.1	5.7	1.1				
5:00 p. m.	...	...	...	...	...	...	55	101	68	
5:35 p. m.	4.4	1.2	3.4	1.3	5.7	1.1				
6:00 p. m.	...	...	...	...	...	...	60	47	109	

* Fasting; urinated at 8:54 a. m.; meat-free supper the previous night.

THE NONPROTEIN NITROGEN IN PATHOLOGIC CONDITIONS

A few typical examples of the nonprotein nitrogen findings in pathologic conditions, will be found in Table 7. It will be noticed at once that the relation between the increases of the total nonprotein nitrogen and of the single waste products, the urea, creatinin and uric acid, is at least roughly the same in the different samples. The table contains one outstanding exception, however: the amino-acid nitrogen. It seems to be quite logical to expect that an increased accumulation of the end-product of the protein metabolism, of the urea, should delay the process of deamination and back up an increased amount of aminonitrogen from free amino-acids and even peptids in the plasma. This is, however, not at all the case. On the contrary, we find extremely low figures for the amino-acids. Even in Sample 7, taken three days before death from uremia, with a plasma urea nitrogen of 234 mg. per hundred cubic centimeters, we find only 7 mg. of aminonitrogen per hundred cubic centimeters.

This fact is made the more interesting by a comparison with the findings in acute yellow atrophy of the liver, in which the most rapid and extensive autolysis of body tissue known takes place. As far as it is possible to judge from the very rare cases hitherto studied by modern methods,[10] we meet here with quite the opposite development: a considerable increase of the aminonitrogen in the blood, while the urea nitrogen remains normal, or is very little increased. From this comparison, the third type of pathologic composition of the nonprotein nitrogen ought not to be excluded: the blood composition in gout. Briefly, we meet here an increased amount of uric acid in the plasma, simultaneous with a normal total nonprotein nitrogen.

Turning again to Table 7, we notice that increase of

10. Feigl, J., and Luce, H.: Biochem. Ztschr. **79**: 162, 207, 1917; Stadie, W. C., and Van Slyke, D. D.: Arch. Int. Med. **25**: 693 (June) 1920.

the creatinin to a considerable extent is found in the plasma. Concerning the uric acid, this predominance of the increase in the plasma is even more marked. So we find that, in a number of samples, the calculation gives as a result the nonexistence of any uric acid at all in the red corpuscles.[11] The further development of this state of partition in the last case in the table is of particular interest. A later sample of blood was drawn from this patient, forty-eight hours after the sample recorded in the table and twenty-two hours before death, when the patient was nearly comatose and for more than twenty-four hours had showed a greatly increased respiration; the plasma carbon dioxid was 22 per cent. and the urine had turned alkaline. This sample showed a creatinin content of 21 mg. in the plasma and 17.5 mg. in the corpuscles, and a uric acid content of 20.6 mg. in the plasma and 11 mg. in the cells, all per hundred cubic centimeters. The total nonprotein nitrogen had increased from 306 to 348 mg. in the plasma and from 193 to 292 mg. in the corpuscles. A premortal breakdown of this surprising separative power of the corpuscles seems here to be developing.

It is, however, not only between the plasma and the corpuscles that this evidently highly developed separative power exists. Something similar seems to be the case between the plasma and the cerebrospinal fluid. This is demonstrated by a few determinations presented in Table 8.

I have already mentioned an undetermined residue of nonprotein nitrogen. After subtracting its two main fractions, the amino-acid and urea nitrogen, from the total nonprotein nitrogen, there is a remainder which cannot be accounted for by the creatinin or the uric acid. We find this residue in the normal blood to be present to a considerably greater extent in the corpuscles than in the plasma (Table 1), just as we find there a greater amount of reacting amino groups. Concerning the possible nature of this residue, Folin and I [12] have recently ventured the hypothesis that it consists, at least partly, of histons. This explanation is, however, less applicable to pathologic conditions. Here, we find an accumulation of unknown products in the plasma, an increase which may appear, as in Case 1 of Table 7, even before any rise of the urea nitrogen. In moderately severe cases of disturbed kidney function, these unknown compounds of the plasma may correspond to about 20 mg. of nitrogen, and, in uremia, may reach values of 50 mg. Concerning their nature, it is possible to say that the simultaneous low figures for the amino-acids exclude the possibility of higher compounds of polypeptid character. If I say that we probably deal with substances which belong to the catabolic processes of metabolism and either are of intermediary nature or are end-products, normally almost completely removed from the plasma, this is of course no explanation. Further research must throw light on this point.

TABLE 7.—SUBSTANTIAL UNIFORMITY IN THE RETENTION OF THE SEVERAL NITROGENOUS WASTE PRODUCTS

	Whole Blood per 100 C.c.						Plasma per 100 C.c.						Corpuscles per 100 C.c.						
Case	Amino-Acid Nitrogen, Mg.	Urea Nitrogen, Mg.	Creatinin, Mg.	Uric Acid, Mg.	Undetermined Residual Nitrogen, Mg.	Total Nonprotein Nitrogen, Mg.	Amino-Acid Nitrogen, Mg.	Urea Nitrogen, Mg.	Creatinin, Mg.	Uric Acid, Mg.	Undetermined Residual Nitrogen, Mg.	Total Nonprotein Nitrogen, Mg.	Amino Acid Nitrogen, Mg.	Urea Nitrogen, Mg.	Creatinin, Mg.	Uric Acid, Mg.	Undetermined Residual Nitrogen, Mg.	Total Nonprotein Nitrogen, Mg.	Corpuscles, Volume, per Cent.
1	5.0	13	1.8	3.7	19	39	4.3	13.0	1.8	**3.7**	20	**39**	5.9	13.0	1.8	3.7	18	39	45
2	6.4	49	2.0	4.5	7.4	65	5.8	47	2.3	**6.4**	18	**74**	7.2	52	1.5	1.6	...	51	50
3	4.5	49	3.0	4.7	22	78	3.5	52	3.0	**6.1**	18	**77**	7.4	41	3.0	0.9	31	81	27
4	5.8	60	7.7	4.8	37	107	5.4	71	8.1	**6.8**	21	**103**	7.2	26	6.5	0.0	86	122	23
5	7.6	91	7.2	6.4	41	144	6.2	109	8.1	**9.3**	23	**144**	11.8	38	4.4	0.0	93	144	25
6	8.4	174	12.9	13.6	75	267	7.5	214	14.5	**18.4**	52	**275**	9.7	113	10.5	6.1	109	238	39
7	7.3	193	16.0	12.0	48	258	7.3	234	19.2	**21.0**	51	**306**	7.3	138	11.7	0.0	43	193	42

TABLE 8.—A COMPARISON BETWEEN PLASMA AND CEREBROSPINAL FLUID

	Plasma per 100 C.c.						Cerebrospinal Fluid per 100 C.c.					
Condition	Amino-Acid Nitrogen, Mg.	Urea Nitrogen, Mg.	Creatinin, Mg.	Uric Acid, Mg.	Undetermined Residual Nitrogen, Mg.	Total Nonprotein Nitrogen, Mg.	Amino-Acid Nitrogen, Mg.	Urea Nitrogen, Mg.	Creatinin, Mg.	Uric Acid, Mg.	Undetermined Residual Nitrogen, Mg.	Total Nonprotein Nitrogen, Mg.
Nonnephritic.....	...	...	....	....	..	...	2.0	11	0.9	0.8	3	17
Uremia (Case 6, Table 7)....	7.5	214	14.5	18.4	52	285	2.8	218	6.1	4.5	0	222
Uremia (Case 7, Table 7)....	6.7	...	22.0	22.6	..	324	2.6	...	6.3	2.6	...	238
The same one, 24 hours later	7.1	...	21.3	20.6	..	348	3.0	272	8.5	2.6	0	279

Indican, whose accumulation in the blood in uremic conditions has been studied especially by German authors,[13] can hardly account for more than 1 mg. of nitrogen. Hippuric acid may perhaps be considered as a possibility. Perhaps substances of high toxicity and of specific importance in the development of uremia will be found in this fraction.

SIGNIFICANCE OF CHANGES IN THE NONPROTEIN NITROGEN CONTENT

We have not yet discussed the significance of an increase in the nonprotein nitrogen content of blood or plasma in chronic interstitial nephritis. Our fairly simple conception that such an increase is due to a direct mechanical retention by an impaired kidney, in the original sense of Strauss, is, of course, as a whole, the correct one. There is, however, at least the possibility, argued especially by German authors, that an elevated nonprotein nitrogen in certain cases represents only a higher level, at which a complete nitrogen

11. As a fact, the calculation points to a loss of some uric acid in the whole blood filtrate. Further work is needed on this point.

12. Folin, O., and Berglund, H.: J. Biol. Chem. **51**: 395 (April) 1922.

13. Haas, G.: Deutsch. Arch. f. klin. Med. **121**: 304, 1917; München. med. Wchnschr. **64**: 1363, 1917. Rosenberg, M.: München. med. Wchnschr. **63**: 117, 1916; Arch. exper. Path. u. Pharmakol. **86**: 15, 1920.

equilibrium is maintained; and in chronic cases, with moderately elevated nonprotein nitrogen persisting for months at the same level, another interpretation seems hardly possible. This type of case deserves a special interest from the dietetic standpoint; if there is no response of the nonprotein nitrogen on a decreased protein intake, the value of a very restricted diet seems questionable.

This brings up the question of the influence of the diet on the level of the nonprotein nitrogen in normal persons. Contrary to a fairly common statement of its independence of the diet, I feel that it is important to point out that a high protein intake—a common finding in wealthy patients—in a person who, clinically, may be considered normal, may give a nonprotein nitrogen content as high as from 40 to 45 mg. in the whole blood and from about 30 to 35 mg. in the plasma; that is, about 75 per cent. higher than the figures from the same individual after a few days of a low protein diet. The point of practical importance to be emphasized is that the change from a high to a low level does not immediately follow the change in the diet. If the lowest possible nonprotein nitrogen figure is wanted in a person on the boundary of the abnormal, it is, therefore, not sufficient merely to have him drop in any morning before breakfast to have his blood tested.

The usefulness of the nonprotein nitrogen determinations, or of the determination of one or another of its constituents for a differential diagnosis between different forms of chronic interstitial nephritis, is a favorite subject of discussion. In general, it has not proved at all possible as yet to apply the physiologic or pharmacologic theories as to kidney function on the functional disturbances of the different anatomic types of kidney lesions. Further, the considerable interest given to a physiologic differentiation between glomerular and tabular activity cannot be further cultivated in the clinic, since we have to admit the fact, especially emphasized by Löhlein, that a disturbance of the glomerular function, due to anatomic lesions, is necessarily followed by a functional disturbance of the tubular activity, as a consequence of the anatomic unity of the blood supply.

Furthermore, there is reason enough to doubt whether a functional disturbance is always accompanied by any appreciable anatomic lesion at all. In the earlier discussion of the character of nonprotein nitrogen retention, attention was called to the difference between the type mainly discussed in this paper, with a fairly uniform retention of the different waste products, and the types of nonprotein nitrogen accumulation in acute yellow atrophy of the liver and in gout. Certainly, the waste product retention cannot be satisfactorily interpreted in any other way than as a result of a deficient kidney activity. The validity of this interpretation is, therefore, independent not only of the simultaneous occurrence of anatomic lesions but even of the occurrence of other clinical signs of kidney disease. Therefore, when reliable observations are reported of a slight elevation of the amount of waste products in the blood in cases of a decompensated heart, or when moderate or even high figures for the blood urea nitrogen are reported in such different types of disease as epidemic (lethargic) encephalitis (Umber) [14] and acute intestinal obstruction (Louria),[15] this does not diminish the clinical value of the determination of the nitrogenous waste products of the blood. On the contrary, the knowledge so gained means an objective, reliable information about kidney function, independent of the presence or absence of other clinical symptoms.

14. Umber, F.: Deutsch. med Wchnschr. **47**: 261 (March 10) 1921.
15. Louria, H. W.: Blood Urea Nitrogen in Acute Intestinal Obstruction, Arch. Int. Med. **27**: 620 (May) 1921.

PRESENT STATUS OF BLOOD NITROGEN IN SURGICAL LESIONS OF THE KIDNEY *

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Since Folin and Denis,[1] in 1913, initiated methods for the rapid determination of the nonprotein blood nitrogen, a great mass of work has been done, especially in chronic nephritis, and its value has been demonstrated repeatedly. It has been shown that uric acid in the blood is retained in some cases very early, but not constantly so; that urea is retained at a later stage in the course of nephritis, and that creatinin is retained shortly before death in the great majority of cases.

Before entering further into the discussion of nitrogen retentions, it is well to state our findings as to normal levels. Two years ago, we placed four of the hospital staff on high protein diets. These diets were prepared in the diet kitchen on the metabolic unit. The blood nonprotein nitrogen of these young men before they were given a high protein diet was from 28 to 38 mg. per hundred cubic centimeters. After three days of high protein diet (protein from 150 to 175 gm.) the fasting (before breakfast) blood nitrogen rose in all cases about 5 mg., the highest found being 45 and the lowest 33.[2]

TABLE 1.—CASES SHOWING A NONPROTEIN NITROGEN OF 50 MG. OR MORE PER HUNDRED CUBIC CENTIMETERS OF BLOOD

Condition	Nonprotein Nitrogen *		Results While in Hospital †	
	Became Normal; Number of Patients	Unchanged or Increased; Number of Patients	Died; Number of Patients	Improved; Number of Patients
Chronic nephritis, twenty-six cases	2 (9%)	20 (83%)	15 (63%)	8 (30%)
Myocarditis, fifteen cases	4 (50%)	4 (50%)	9 (60%)	6 (40%)
Enlargement of prostate, twenty cases ‡	6 (43%)	8 (58%)	7 (44%)	10 (59%)
Pyelonephritis and pyelonephrosis, ten cases §	5 (50%)	4	5 (50%)	5 (50%)
Total, seventy one cases	17	36	36	29

* Only cases having more than one determination are included in percentages.
† Only cases treated included.
‡ Three cases were carcinoma of prostate. Two cases showed a rise as result of operation.
§ Three cases were due to obstruction by carcinoma.

Folin,[3] in his last paper, reported a case of high protein feeding whose fasting nitrogen was 43 mg. The normal level on the average diet is from 25 to 38 mg. per hundred cubic centimeters of blood. Certainly, the blood nonprotein nitrogen must be above 40 mg. per hundred cubic centimeters before retention can be said to be present.

There is considerable difference in the interpretation of the retention of blood nitrogen in the different

* Read before the Section on Urology at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.
1. Folin and Denis: J. Biol. Chem. **14**: 29, 1913.
2. This work was done by Dr. A. E. W. Ochsner.
3. Folin, O., and Berglund, H.: J. Biol. Chem. **51**: 395 (April) 1922.

classes of kidney disease. In chronic nephritis, such as is seen in the medical wards of any hospital, there has been a gradual destruction of kidney tissue, analogous, from the functional standpoint, to the experimental surgical removal of kidney tissue; while, in the infectious and obstructive processes of the genito-urinary tract seen by urologists, the loss of kidney function may be, in a large measure, of a functional nature. After drainage and removal of the obstructions, the functional loss may be partially regained. If these latter conditions have gone on long enough, permanent loss of kidney function results, just as in the case of chronic nephritis.

TABLE 2.—CASES IN WHICH NONPROTEIN NITROGEN BECAME NORMAL FROM A LEVEL OF 50 MG. OR MORE OF NITROGEN PER HUNDRED CUBIC CENTIMETERS OF BLOOD

Case and Diagnosis	Highest Nonprotein Nitrogen, Mg	Time to Become Normal, Days	Outcome
1. Pyelonephritis	156	30	Well after two years
2. Congenital kidney disease and hydronephrosis	67	7	Nephrectomy
3. Enlargement of prostate	58	3	Punch operation
4. Congenital kidney; hydronephrosis	74	14	Nephrectomy
5. Pyelonephritis; pyelonephrosis	58	3	No operation
6. Enlargement of prostate	58	3	Prostatectomy
7. Enlargement of prostate	118	7	Not operated on
8. Enlargement of prostate	72	30	Prostatectomy
9. Enlargement of prostate	92	6	Following prostatectomy
10. Carcinoma of rectum; pyelonephrosis	63	12	Operation for carcinoma
11. Enlargement of prostate	60	30	Prostatectomy
12. Carcinoma of prostate	59	4	Prostatectomy

The chemical laboratory of Barnes Hospital, in the course of a year, performs more than 800 determinations of the nonprotein nitrogen. Of patients on whom these determinations were made in the past two years, there were 100 who showed values above 50 mg. per hundred cubic centimeters of blood. The value 50 mg. per hundred cubic centimeters was selected because it shows definitely developed retention of urea. Table 1 presents the difference between the course of cases while in the hospital as regards the nonprotein nitrogen, as well as the clinical outcome.

The cases of chronic nephritis were not materially improved, as shown by the failure of the nonprotein nitrogen to go down after having reached this level, and by the high death rate. Cardiac patients show a decided difference from nephritic. With them, recovery from retention of nitrogen depends entirely on how well the heart will respond to treatment. Still better are the results of kidney disease due to obstructive and infectious processes. Table 1 presents the fact already well appreciated by the urologist. To those interested in the functional ability of the kidney, it shows that obstructive and infectious processes do not injure the kidney cell to the extent that it will not regain some of its function. Johnson's [4] experimental work on this point showed that, with complete obstruction of the ureter and subsequent removal of ligation, function can be regained even after two weeks of complete obstruction. He demonstrated that it required 150 days for complete restoration of function in a kidney whose ureter has been ligated two weeks. These results agree with clinical observations. An important point to the urologist is the length of time required to reduce retention cases.

Analyses of these cases, reported in Table 2, show that if the blood nitrogen does not reach normal level within a month of hospital treatment, it will never do so.

Not only can infectious processes depress kidney function when these processes involve both kidneys, but also, with only one kidney diseased, systemic intoxication may result, so that the function of the opposite kidney, and not the main site of disease, is seriously affected. That systemic intoxications can severely depress kidney function has been most strikingly demonstrated experimentally by Whipple [5] and his co-workers. These observers, while investigating intestinal obstruction, found that there was a great increase in nitrogenous catabolism, as shown by the excretion of nitrogen in animals with experimental obstruction. The blood of these animals showed an increase in nonprotein nitrogen and urea and a small increase in animo-acid and polypeptid nitrogen.

They further showed that the accumulation of nitrogenous products in the blood was accompanied by a definite loss of kidney function, as shown by the rate of urea excretion and by the excretion of phenolsulphonephthalein; also that the intoxication as observed in the animals paralleled the loss of kidney function. They further found that this loss of function was temporary and that rapid recovery followed the removal of the obstruction. But, most interesting of all, they found that on sectioning these kidneys there was, by all the staining methods at their command, no apparent lesion of the kidney cells.

They found the same results as far as urinary nitrogen was concerned in sterile abscesses and in experimental peritonitis and pleuritis. The same effect on kidney function was also noted when the proteose obtained from obstructed intestinal loops was injected into animals.

Whipple's work suggests the possibility that, in the case of unilateral disease of the kidney causing systemic intoxication, it would be possible so to injure temporarily the good kidney that much increased loss of renal function might result. That such cases do occur can be clearly shown by the following case histories.

TABLE 3.—FINDINGS IN CASE 1

Date	Phenolsulphonephthalein in Two Hours per Cent.	Nonprotein Nitrogen per 100 C.c., Mg.	Clinical Notes
November 3	..	41	Temperature, 100 F.
November 11	50	74	Chills; white blood cells, 9,000; temperature, 103 F.
November 25	50	36	Temperature, 100 F.
Nephrectomy, left:			
December 5	65	35	

REPORT OF CASES

CASE 1.—S., a white man, aged 40, complained of pain in the left flank, radiating down the leg, with tenderness and muscle spasm in the left lower quadrant, where a mass was felt. Cystoscopic examination and pyelogram revealed an ectopic kidney lying behind the bladder, with a considerable degree of hydronephrosis, the ureter being kinked on itself. The urine showed blood and pus.

4. Johnson, R. A.: J. Exper. Med. **28**: 193 (Aug.) 1918.

5. Whipple, G. H, and Van Slyke, D. D.: J. Exper. Med. **28**: 213 (Aug.) 1918. Cooke, J. V., and Whipple, G. H.: Ibid. **28**: 223, 243 (Aug.) 1918. McQuarrie, I., and Whipple, G. H.: J. Exper. Med. **29**: 397 (April) 1919.

Congenital kidney disease left (ectopic kidney), hydronephrosis, left, and pyonephrosis, left, were diagnosed. Experimental findings and clinical notes are presented in Table 3.

Case 2.—S., a colored boy, age 8 years, who had undergone appendectomy one year previously, was referred, December 13, because of pyelitis. There were resistance and tenderness in the right kidney region, but no mass. Muscle spasm was present, especially on the right side. The third day in hospital, he suffered a chill, following which he ran a septic temperature for nine days. Abdominal rigidity increased. Nephrostomy was performed, December 18, purulent urine being drained off; a congenital kidney condition was found. Nephrectomy was performed, January 5, with uneventful recovery.

Congenital kidney, right, hydronephrosis, right, and pyelonephritis, right, were diagnosed. Findings and clinical notes are presented in Table 4.

TABLE 4.—FINDINGS IN CASE 2

Date	Phenolsulphonephthalein in Two Hours per Cent.	Nonprotein Nitrogen per 100 C.c., Mg.	Clinical Notes
December 14	40	..	Abdominal spasm
December 16	..	67	Chill; temperature, 102 F.; white blood cells, 16,000
December 17	55		
December 18	Nephrostomy, right		
December 23	..	32	Temperature normal
January 3	45	33	
January 5	Nephrectomy, right		
January 24	55		

Case 3.—S., a white woman, aged 23, an American, had chills and fever, with pain in the right side of the abdomen. The right kidney was tender and enlarged, and there was marked abdominal spasm. The left pole was not so tender. Soreness had been felt in right side for many years. Acute onset occurred five days previously. The temperature was 102 F; pulse, 128; white blood cells, 13,000, later, 23,000. There was pus from both kidneys in large amounts. The right ureter was blocked; cystitis was marked. The patient was treated with forced fluids and hexamethylenamin. There was no surgical treatment.

Pyelonephritis, right and left, nephroptosis, right, and pyelonephritis, right, were diagnosed. The findings and clinical notes are presented in Table 5.

TABLE 5.—FINDINGS IN CASE 3

Date	Phenolsulphonephthalein in Two Hours per Cent.	Nonprotein Nitrogen per 100 C.c., Mg.	Clinical Notes
February 3	19	100	Abdominal spasm; temperature, 102 F.; white blood cells, 23,000
February 7	25	116	Temperature normal
February 16	..	59	
March 2	13	...	Patient up
May	..	30	

Cases 1 and 2 show that infection in one kidney, with such insufficient drainage as to cause severe systemic manifestations, will depress the function of the opposite kidney to the extent of causing urea retention. These clinical observations are quite analogous to Whipple's experimental work.

Case 3 shows bilateral infection of a much more severe type, but with partial improvement in function following drainage and subsidence of systemic symptoms. It is possible, in infection of one kidney without obstruction, to impair the function of the other; but such situations are not usual. The most important value of the nonprotein nitrogen is the help it gives in estimating the extent of disease. This is especially important to the surgeon.

Pearce,[6] in 1908, showed that dogs could be kept in nitrogen balance when one half, and in some instances three fourths, of the total kidney substance had been removed. His work, unfortunately, was done before the present tests for kidney function were in use.

Rowntree and Geraghty,[7] in their report on the use of phenolsulphonephthalein in functional tests, demonstrated that removal of one kidney did not materially affect the excretion of the dye, even as early as twenty-four hours after operation, and, in surgical cases, they demonstrated that, three weeks after nephrectomy, the kidney function as shown by this test was normal. We have found that there is a fairly constant relation between phenolsulphonephthalein in excretion and blood nitrogen. Cases of nitrogen retention which showed a normal phenolsulphonephthalein excretion have not been observed. In fact, it is extremely rare to see nitrogen retention unless the phenolsulphonephthalein excretion is 40 per cent. or less in two hours. This holds good in any type of low kidney function.

Reid,[8] in 1918, showed that one kidney might be destroyed by experimental hydronephrosis without any increase of nonprotein in nitrogen in the blood.

Addis [9] and his co-workers have done very extensive work on the excretion of urea and the factors that control it, and have shown that, from the standpoint of urea and of the ability of the kidney to excrete urea, the kidney substance can take care of seven times the amount of urea ordinarily excreted. In other words, they find, by the process of overburdening the kidney with injected urea, that there is sevenfold the capacity for the excretion of this product that is ordinarily needed. Presumably, then, only one seventh of the kidney substance is ordinarily used.

Certainly more than 50 per cent. of kidney function must be lost before the phenolsulphonephthalein elimination is decreased, and probably more than 60 per cent. before nonprotein nitrogen is increased. If this is true, the retention of urea always means bilateral disease, whether anatomic or functional. In 250 surgical cases involving the kidney in the past two years, we have never seen retention of nitrogen without bilateral disease.

SUMMARY

The interpretation of the retention of urea depends on the nature of the disease present, and especially on the presence of systemic intoxication.

With retention of urea, bilateral disease is always present, whether anatomic or functional or both.

Wall Building—University Club Building.

6. Pearce, R. M.: J. Exper. Med. **10**: 632, 1908.
7. Rowntree, L. G., and Geraghty, J. T.: The Phthalein Test, Arch. Int. Med. **9**: 284 (March) 1912.
8. Reid, M. R.: Bull. Johns Hopkins Hosp. **29**: 55 (March) 1918.
9. Addis, T.; Shevky, A. E., and Bevier, J.: Am. J. Physiol. **46**: 11 (April) 1918.

Smallpox in 1922.—Reports from twenty-four American states and 190 cities show that the smallpox prevailing during the first six months of 1922 is far more virulent than the type of disease which prevailed during the same period of 1921. The number of cases was 72 per cent. less this years in twenty-four states combined, and 74 per cent. less in 190 American cities. In these cities, however, the number of deaths during the first six months of 1922 was nearly four times the number reported in the same period of 1921. . . . No American city can be assured of safety in view of the record this year in cities which prior to 1922 had not had experience with the virulent type of the disease.—*Statistical Bulletin, Metropolitan Life Insurance Co.*, August, 1922.

THE VALUE OF THE ESTIMATION OF UREA, NONPROTEIN NITROGEN AND CREATININ

AS AN INDEX OF RENAL FUNCTION *

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Our knowledge of blood chemistry, so far as it concerns renal disease, is of comparatively recent origin. The development of simplified methods of estimating the amount of the various substances in health and disease has rapidly led to the accumulation of enormous data concerning their variations. Estimations of total nitrogen by the Kjeldahl method have been made for a number of years, but this method is too intricate for general clinical use and can be carried out only by trained chemists in well-equipped laboratories. From the determinations made by this method, however, it was well known that in advanced renal disease the total nitrogen in the blood was greatly increased, and later observations have shown that this increase is due in great measure to the retention of nitrogenous end-products, normally excreted by the healthy kidney. As urea is the most prominent of these substances, blood urea determinations were at first, naturally, studied most carefully.

The work of Folin and Denis in the development of a simplified technic for the accurate estimation of blood urea gave probably the first great impetus to this investigation, and later the introduction of the urease method of blood urea determinations by Marshall gave us a simple, practical and accurate procedure. These determinations by this method are perfectly feasible for any modern, well-equipped clinical laboratory, and the technic of the procedure can be readily mastered.

The normal urea content of the blood is subject to considerable variation. It is recognized as varying normally from 20 to 40 mg. per hundred cubic centimeters, although a figure of 50 mg. cannot be considered abnormal in persons on a high nitrogenous diet. We have observed patients with definite impairment of renal function on a moderate protein diet whose blood urea ranged between 60 and 80 mg., who, following restriction of their diet, would promptly reach a urea level below the upper limit of normal. These patients, on the resumption of a high nitrogenous intake, would soon show their former blood urea level. The practical value of this point is that, in the interpretation of the blood urea content in a given case, the diet of the patient should be taken into consideration. It is at once apparent that a blood urea of 50 mg. in a person on a nonprotein diet has not the same significance as the same level of blood urea in a person whose protein intake is high.

Another factor which should receive consideration in the interpretation of the blood urea level is the fluid intake. It has been noted repeatedly and also observed by ourselves that a high blood urea content can be noticeably and even markedly reduced in many instances following the ingestion of large amounts of water. The amount of urea excreted can be shown to vary considerably with the amount of urine output; and this is especially true when the renal damage is not extreme. These two factors, diet and fluid intake, do not have to be considered in the matter of phenolsulphonephthalein, as the amount excreted is not influenced by either factor.

A rise of blood urea above normal is to be interpreted as an index of bilateral renal insufficiency; but it has been our experience that, not infrequently, patients can maintain a fair degree of health for a considerable period of time with a urea of 80 mg., and in occasional cases a point considerably higher. On the other hand, cases are occasionally seen in definite uremia with a blood urea not higher than that noted above, so that an accurate prognosis cannot always be drawn from the urea alone, it being frequently necessary to take other factors into consideration.

When the blood urea rises to 100 mg. or higher, the prognosis becomes increasingly grave. An amount above this level can seldom be maintained for any considerable period without the exhibition of grave symptoms of renal insufficiency. In acute renal processes or in acute exacerbations of chronic renal disease, the urea level may rise to an astonishingly high figure without a necessarily fatal termination. We have observed cases of acute suppurative kidneys with oliguria or anuria, in which the urea rose to 250 mg., with subsequent recovery and a return of the urea to the normal level. Numerous instances of figures even higher than this have been reported. These high figures are rarely attained in cases of chronic renal insufficiency, and when they occur nearly always terminate fatally. The same observation has been made regarding phenolsulphonephthalein excretion. When a patient has a persistently low excretion of phenolsulphonephthalein and suddenly develops symptoms of acute insufficiency with a sudden drop to zero or but a trace of the dye, he rarely survives. On the other hand, the development of an acute renal condition in a person who has previously had a moderately good or high phenolsulphonephthalein excretion, even though during the acute process the output may drop to zero, does not necessarily lead to a fatal termination.

Estimations of nonprotein nitrogen are utilized in some laboratories instead of estimations of blood urea. The technic, however, for the estimation of nonprotein nitrogen is considerably more complicated than is that for blood urea, while the information of clinical value derived from them does not seem to us to be superior to that furnished by the blood urea.

Quantitative determinations of blood creatinin, an end-product of endogenous metabolism, would seem, theoretically, to be an ideal means of estimating the degree of renal insufficiency. The amount of creatinin in the blood is not influenced, as is urea, by the protein intake, so that it would be expected that a rise of creatinin above normal would be a truer index of renal disturbance. It has been found by Squier and Myers, and we have been able to corroborate their findings, that creatinin is much more readily excreted than urea and uric acid, and that considerable diminution in renal function can occur before there is any rise in the creatinin level.

The normal blood content of creatinin averages about 2 mg. per hundred cubic centimeters, and as a rule there is no appreciable increase in this amount until well marked renal insufficiency, as determined by blood urea and phenolsulphonephthalein, is present. When a marked increase of creatinin occurs, say 5 mg. or more, there is present a very serious disturbance of

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* Read before the Section on Urology at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.

renal function. The combination of a high blood urea with a high creatinin offers a distinctly graver prognosis than the same amount of urea with a normal creatinin content. It is at once apparent that the value of this determination as a functional test is rather limited and is by no means as delicate an index of renal function as the estimation of blood urea. It furthermore seldom gives information which is not obtained by the determination of urea.

The finding of an increase above the normal level of blood urea and the other substances considered can be taken as an indication of bilateral renal disease. However, it gives no information regarding the presence of a unilateral functional disturbance, nor does it exclude the presence of a bilateral renal lesion. When there is a rise above normal of these substances in the blood, it indicates a functional disturbance of considerable degree and is a contraindication to an operative procedure which will permanently decrease the amount of renal tissue in the individual. The estimation of blood urea is not a test of the excretory capacity of the kidney, but is merely a means of determining the degree of retention of a substance normally eliminated. The excretory capacity of the kidneys is most simply and accurately determined by means of phenolsulphonephthalein. The test can be employed in determining not only the total functional capacity but also the individual functional value of each kidney in conjunction with ureteral catheterization. In estimating total renal function, a decrease of the amount normally excreted in a given time indicates bilateral renal disturbance. Whether this reduction is permanent or temporary and the cause thereof can be determined only by other methods of examination. Thus, a marked reduction in function can occur in bilateral calculous disease and still no indication of this functional disturbance will be shown by the blood urea estimation, as the kidneys may maintain an excretory capacity necessary for the work they are called upon to perform.

The total estimation of function by means of phenolsulphonephthalein will give us, more or less accurately, the amount of reduction in excretory capacity, but it does not necessarily tell us whether the excretory capacity is sufficient to take care of the elimination. It has been our experience that when the phenolsulphonephthalein excretion is normal, the blood urea will almost invariably be found at the normal level. When the phenolsulphonephthalein excretion is reduced approximately one half, there may or may not be retention of the various substances in the blood; but when the phenolsulphonephthalein output is markedly reduced, say to 10 or 15 per cent., the blood urea will nearly always be found considerably increased, and there will exist in many instances what may be termed an inverse parallelism between the degree of retention on the one hand and the excretory capacity on the other.

Phenolsulphonephthalein estimations are carried out as a routine in our clinic in all cases. If the phenolsulphonephthalein excretion is found to be much reduced, blood urea estimations are made in order to determine the degree of retention, if any, which is present. It has been our experience that patients with a certain phenolsulphonephthalein excretion but with an increase in the blood urea above the normal level are far worse surgical risks than patients having the same phenolsulphonephthalein output and normal blood urea.

When one comes to consider the application of blood retention tests and of excretory tests in the determination of the separated renal functions, their values are not comparable. The information furnished by the excretory tests is incomparably superior, as it gives us not only the function of one kidney as compared with that of the other but also the total excretory capacity.

To say that one test is superior to the other as an index of renal function indicates a lack of appreciation of the character of information which each test is supposed to furnish, as the data supplied by each test are largely corroborative of the other. At times, the estimation of blood urea gives us information regarding the degree of retention present which is not furnished by phenolsulphonephthalein. On the other hand, the measure of the excretory capacity of the kidneys by means of phenolsulphonephthalein gives us data which estimations of blood urea do not furnish. Consequently, in doubtful cases, the greatest amount of information will be derived from both tests. This truth is now well recognized by men most familiar with renal functional work.

SUMMARY AND CONCLUSIONS

Practically all the information of clinical value gained by estimations of total nitrogen, nonprotein nitrogen, uric acid and creatinin is furnished by the estimation of the blood urea content.

Estimation of blood urea by the urease method of Marshall is accurate and comparatively simple.

The excretory capacity of the kidney for the estimation of the total and separated function is best determined by the phenolsulphonephthalein test.

In certain cases of bilateral renal disease, the greatest amount of information is obtained by an estimation of the blood urea and a measure of the excretory capacity by means of phenolsulphonephthalein.

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SIGNIFICANCE OF CHEMICAL BLOOD FINDINGS IN UROLOGIC CONDITIONS*

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Before surgical procedures are undertaken on the kidneys, bladder or prostate, it is essential that the normality of kidney function be ascertained, since disease of these organs not infrequently leads to impairment in renal function. The introduction of the phenolsulphonephthalein test by Rowntree and Geraghty,[1] in 1910, afforded a relatively simple means of measuring kidney function, but the difficulty of securing accurate collections of urine in cases with obstruction has tended to impair the value of the test in this type of case. The advent of simple methods of blood analysis, however, has made it possible to ascertain the functional activity of the kidneys without recourse to tests on the urine. The various chemical blood tests unquestionably furnish a much broader appreciation of renal function than that obtained by the phenolsulphonephthalein test alone. However, they only mea-

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* Read before the Section on Urology at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.
1. Rowntree, L. G., and Geraghty, J. T.: J. Pharmacol. & Exper. Therap. 1: 579-661, 1910.

sure the function of the kidneys as a whole, and in the differentiation of the activities of the two kidneys, the phenolsulphonephthalein test still appears to be the method of choice.

The use of chemical blood analysis as a means of measuring kidney function was begun in the urologic service in 1914, and has been routine since 1915. During this time, observations have been collected in more than 600 cases, about 400 being cases of prostatic obstruction. The various determinations made have included the urea and nonprotein nitrogen, creatinin, uric acid, chlorids, carbon dioxid combining power and sugar. Of the different tests, we have found the urea the most valuable. It furnishes rather more information than the nonprotein nitrogen and is not so difficult to carry out. Since creatinin is normally the most readily eliminated of the nitrogenous waste products, its retention does not occur until after the urea has doubled or more than doubled the normal. For this reason, the creatinin is significant only in those cases which show a definite urea retention. The normal kidney does not excrete uric acid with ease, and a rise in the blood uric acid appears to be one of the earliest signs of impaired function. Although most cases of prostatic obstruction, for example, show high figures for uric acid, it is of much less value in preoperative tests than the urea and creatinin. Relatively few of the urologic cases studied have shown any increase in the blood chlorids. This test does not appear to be significant except in a limited number of cases, especially the more severe cases with nitrogen retention. The chief value of blood sugar in urology is in indicating diabetic tendencies, although it should be noted that most cases with nitrogen retention show mild though definite hyperglycemias. The carbon dioxid combining power should be ascertained in all cases showing any evidence of nitrogen retention or hyperglycemia.

The strict normals for these different determinations may be taken as from 25 to 35 mg. of nonprotein nitrogen per hundred cubic centimeters of blood; from 12 to 15 mg. of urea nitrogen; from 1 to 2.5 mg. of creatinin; from 2 to 3.5 mg. of uric acid; chlorids calculated as sodium chlorid in whole blood, from 0.45 to 0.50 per cent.; sugar, from 0.09 to 0.12 per cent.; and carbon dioxid combining power, from 55 to 75 c.c. per hundred cubic centimeters of plasma.

Our routine at the present time includes the estimation of urea and sugar in all cases, creatinin, when the urea nitrogen exceeds 20 mg., and carbon dioxid when any abnormality exists in either the urea or the sugar. Other determinations are made only in special cases. The methods we have employed are described elsewhere.[2]

Our experience indicates the necessity of having preoperative information on the chemistry of the blood in all surgical conditions of the kidneys, bladder or prostate. It not infrequently furnishes information in the least suspected cases.

PROSTATIC OBSTRUCTION

We have now collected preoperative, and, in some cases, postoperative figures on about 400 cases of prostatic obstruction. Uncomplicated cases show on the average urea nitrogen figures which are definitely above the normal of from 12 to 15 mg. per hundred cubic centimeters of blood. The average is probably about 18 mg., with a range of from 11 to 25 mg. Twelve illustrative cases are shown in Table 1. These are recent cases and were selected because they also had

TABLE 1.—ILLUSTRATIVE CHEMICAL BLOOD FINDINGS IN UNCOMPLICATED CASES OF PROSTATIC OBSTRUCTION

			Blood Analyses				Phenolsulphonephthalein, per Cent.
Case	Age	Date	Urea Nitrogen, Mg.	Creatinin, Mg.	Sugar, per Cent.	Chlorids as Sodium Chlorid, per Cent.	
1. M. K.	54	4/20/21	13.2	1.8	0.125	.....	..
2. C. D.	60	5/ 2/21	12.0	1.8	0.100	.....	..
3. A. R.	57	5/ 6/21	13.1	2.1	0.121	.....	..
4. J. C.	45	8/26/21	21.3	...	0.166	.....	21
5. L. V.	63	9/10/21	29.0	2.0	0.172	0.450	..
		9/12/21	24.9	2.6	0.142		
6. R. T.	66	9/15/21	13.9	...	0.166	0.475	23
7. S. L.	59	10/13/21	15.0	...	0.187	0.475	..
8. W. K.	49	10/17/21	19.5	...	0.150	0.563	..
9. L. M.	60	11/22/21	12.4	...	0.136	0.500	..
10. G. D.	67	11/23/21	22.5	3.3	0.150	0.500	30
		11/25/21	20.4	3.1	0.103		
11. H. F.	74	11/28/21	10.2	...	0.150	0.488	8
12. M. McG.	67	12/ 7/21	11.4	...	0.136	0.525	35

figures for the chlorids. The average for the ureas, however, is slightly below that generally found.

In our first paper,[3] we stated that:

> Cases showing urea nitrogen figures under 20 mg. per 100 c.c. of blood may be regarded as good operative risks so far as the kidneys are concerned. When the urea nitrogen figures are found between 20 and 30 mg., and especially between 25 and 30, the patient should be operated on with considerable caution, and best after a period of preliminary treatment directed to relieve the nitrogen retention. . . . The data here recorded indicated that with urea nitrogen figures over 30 mg. the operative prognosis is bad.

The last statement should be modified in the light of our more extensive experience. Since it was made, we have had occasion to deal with a number of patients with considerable nitrogen retention, urea nitrogen figures being as high as 50 mg. in several instances. After a more or less prolonged period of preoperative treatment, which favorably influenced the blood urea, these patients have been operated on with favorable results. Data on four such cases are given in Table 2.

TABLE 2.—THE INFLUENCE OF PREOPERATIVE TREATMENT ON THE BLOOD UREA IN PROSTATIC OBSTRUCTION; PROSTATECTOMY WITH GOOD RESULTS

			Blood Analyses					Suprapubic Prostatectomy Date
Case	Age	Date	Urea Nitrogen, Mg.	Creatinin, Mg.	Sugar, per Cent.	Carbon Dioxid, C.c.	Chlorids as Sodium Chlorid, per Cent.	
1. J. S.	60	4/22/20	46.6	4.3	.....	..	.....	5/ 5
		4/27/20	42.6	4.8				
		5/ 4/20	19.0	2.4				
2. S. M.	62	7/ 7/20	51.0	3.2	0.128	42	.....	7/12
		7/16/20	49.0	2.6	0.100	43		
		7/29/20	29.0	2.4	0.128			
3. J. McD.	61	5/11/21	28.8	3.5	0.114	..	0.507	5/19
		5/18/21	24.9	2.6	0.115			
		6/ 1/21	22.5	...	0.150	..	0.450	
4. G. B.	62	3/23/22	52.0	5.3	0.166	44	0.575	4/17
		3/25/22	55.9	8.9	0.170	..	0.600	
		3/29/22	35.0	5.0	0.140	47	0.563	
		4/ 1/22	37.5	7.5	0.133	48	0.553	
		4/ 7/22	20.6	5.0	0.130	..	0.500	
		4/12/22	23.4	4.5	0.138	62	0.538	
		4/15/22	22.0	4.2	0.109			

The blood urea and creatinin have been taken as the index of the duration of the preoperative care. A knowledge of the carbon dioxid combining power has been found of considerable preoperative value in these cases, since patients in whom there is a reduction in

2. Myers, V. C.: Practical Chemical Analysis of Blood, St. Louis, C. V. Mosby Company, 1921.

3. Squier, J. B., and Myers, V. C.: J. Urol. 2: 1-21 (Feb.) 1918.

the alkali reserve withstand operative interference better after receiving alkaline medication. One should remember, however, that patients with marked nitrogen retention who do not readily yield to treatment are suffering from advanced renal disease and are obviously poor surgical risks (Table 3). Serial figures which

TABLE 3.—PROSTATIC OBSTRUCTION IN WHICH OPERATION WAS INADVISABLE

			Blood Analyses				
Case	Age	Date	Urea Nitrogen, Mg.	Creatinin, Mg.	Sugar, per Cent.	Carbon Dioxid Combining Power, C.c.	Comment
1. J. S.	69	5/ 4/17	89	9.4	0.165	..	Cystotomy and drainage of bladder only on 5/5; died, 5/19
		5/15/17	104	7.5	0.201		
2. E. W.	69	2/ 8/17	45	4.0	0.132	34	Prostatectomy on 2/12 under procain; died, 2/20
		2/ 9/17	44	4.2	0.117		
		2/15/17	104	6.7	0.165		
3. F. S.	54	5/16/21	136	4.6	0.157	..	Retention not much influenced by diet; died, 6/1
		5/23/21	122	7.9	0.156	29	
		5/31/21	75	12.5	0.225	26	

we have collected on uncomplicated cases of prostatic obstruction have shown that operative interference almost invariably provokes a rise in the blood urea, for example, from 15 to 30 mg. Three such cases are presented in Table 4. It is easy to comprehend this effect on a badly damaged kidney.

TABLE 4.—INFLUENCE OF PROSTATECTOMY ON THE BLOOD UREA IN CASES WITH NORMAL PREOPERATIVE FINDINGS AND UNEVENTFUL RECOVERIES

			Blood Analyses				
Case	Age	Date	Urea Nitrogen, Mg.	Creatinin, Mg.	Sugar, per Cent.	Carbon Dioxid Combining Power, C.c.	Operation
1. F. D.	72	4/ 6/20	18.1	1.7	0.117	..	Prostatectomy
		4/ 7/20	30.8	3.5	0.105	39	
		4/16/20	16.8	2.2	0.093		
2. J. B.	63	4/ 9/20	12.1	1.7	0.120	..	Prostatectomy
		4/10/20	....	...	.....	..	
		4/12/20	30.2	2.5	0.107		
		4/16/20	17.8	2.2	0.102		
3. G. B.	58	4/15/20	14.4	1.8	0.130	..	Prostatectomy
		4/17/20	....	...	.....		
		4/19/20	21.0	1.8	0.097		
		4/22/20	16.9	1.8	0.111		

VESICAL NEOPLASMS

The blood findings in vesical neoplasms, whether malignant or nonmalignant, are similar to those found in prostatic obstruction, the urea nitrogen on the aver-

TABLE 5.—VESICAL NEOPLASMS

			Blood Analyses					
Case	Age	Date	Urea Nitrogen, Mg.	Creatinin, Mg.	Sugar, per Cent.	Carbon Dioxid, C.c.	Diagnosis	Result
1. J. G.	61	9/24/19	23.8	2.0	0.094	..	Papilloma	Cured
2. E. P.	74	9/25/19	14.0	2.2	0.139	..	Carcinoma	Improved
		10/ 1/19	23.0	2.6	0.165			
		10/13/19	15.3	1.7	0.120			
3. J. L.	60	10/22/19	20.4	...	.....	..	Papilloma	Improved
4. F. C.	57	12/12/19	56.2	4.5	0.120	43	Carcinoma	Died
5. W. F.	66	1/ 5/20	52.8	4.5	0.093	..	Carcinoma	Died
6. E. McC.	43	8/ 3/20	15.0	2.3	0.110	..	Papilloma	Improved
7. W. L.	65	8/28/20	8.5	1.5	0.121	54	Carcinoma	Improved
8. C. C.	58	12/ 7/20	22.2	2.2	0.116	..	Carcinoma	Improved
9. A. O.	62	1/ 8/21	10.6	2.5	0.135	..	Carcinoma	Improved
10. S. G.	56	3/18/21	15.0	2.5	0.107	..	Carcinoma	Improved

age being only slightly increased, if we except those cases which show definite evidence of nitrogen retention. Our experience would indicate that urea nitrogen figures of over 30 mg. afford an unfavorable prognosis in carcinoma of the bladder, irrespective of the therapeutic procedure. Cases illustrating some of the points are given in Table 5.

DOUBLE POLYCYSTIC KIDNEY

It is of interest to note that at the time when patients having a double polycystic kidney apply for medical aid, they almost invariably show quite marked nitrogen retention, the figures being comparable with advanced interstitial nephritis, although the retention of creatinin in proportion to the urea is higher, if anything, than in chronic nephritis.

LESIONS REQUIRING NEPHRECTOMY

While blood analyses indicate the condition of both kidneys, they are of value in determining the operability of patients with unilateral renal lesions. In such cases, the blood findings are usually within normal limits. The findings in several nephrectomy cases are given in Table 6. However, in lesions necessitating nephrectomy, the toxemia produced by the renal infection sometimes temporarily impairs the function of the other kidney, so that the urea nitrogen may be 30 mg.

TABLE 6.—RENAL LESIONS NECESSITATING NEPHRECTOMY

			Blood Analyses			Phenolsulphonephthalein		
Case	Age	Date	Urea Nitrogen, Mg.	Creatinin, Mg.	Sugar, per Cent.	2-Hour Output, per Cent.	Diagnosis	Result
1. H. C.	18	11/ 4/19	23.5	1.9	0.120	50	Congenital cyst	Improved
		11/26/19	17.4					
2. M. G.	43	12/ 2/19	24.1	2.0	0.125	48	Hypernephroma	Died
3. A. N.	27	12/12/19	17.5	2.0	0.102	64	Nephrolithiasis	Cured
4. A. H.	23	12/17/19	14.7	1.9	0.083	50	Tuberculous kidney	Improved
5. S. L.	31	12/27/19	14.4	1.8	0.094	42	Tuberculous kidney	Improved
6. B. McG.	39	1/ 5/20	11.9	1.6	0.093	44	Arteriosclerosis	Improved
7. M. R.	44	3/19/20	11.5	1.5	0.106	..	Pyonephrosis, nephrolithiasis	Improved
8. T. F.	34	4/15/20	13.0	2.0	0.111	..	Pyonephrosis	Improved

or more. When the diseased kidney has been removed, however, the urea drops to normal. In bilateral nephrolithiasis in which nephrotomy and nephrectomy are indicated, the information obtained from the blood, coupled with the separate phenolsulphonephthalein excretion, is of great prognostic value.

SUMMARY AND CONCLUSIONS

Preoperative information on the chemistry of the blood should be secured in all surgical conditions of the kidneys, bladder or prostate. The information is of more value in prostatic than in other urologic lesions.

Of the different chemical blood tests, the urea is the most helpful, although, with urea retention, the creatinin or carbon dioxid combining power may be more significant.

Patients presenting urea nitrogen figures over 25 mg. should be operated on with caution, and best after a period of preliminary treatment directed to relieve the nitrogen retention. This applies particularly to any lesion inhibiting the output of urine.

Infant Mortality in Lima.—According to Dr. Osma, the mortality among infants under 1 year of age was 1,146 in 1917; 1,312 in 1918; 1,209 in 1919, and 1,352 in 1920; the death rate per 10,000 inhabitants being, respectively, 218, 208, 189 and 198. In 1921, out of 6,957 births, 1,900 took place at the Maternity and Public Beneficence Hospital.

COMPARATIVE VALUES OF INDIGOCARMIN AND BLOOD BIOCHEMICAL TESTS

IN THE ESTIMATION OF KIDNEY FUNCTION *

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A comparison of the value of indigocarmin and the various blood biochemical tests with any idea as to which may be the most accurate or reliable in the determination of kidney function is probably, on *a priori* grounds, doomed to failure. Indigocarmin is, as we all know, a dye employed to test the ability of the kidneys, in health or disease, to excrete an artificially introduced foreign substance—a so-called test of elimination. The blood biochemical tests, three of which we have elected to study in comparison, urea nitrogen, total nonprotein nitrogen, and creatinin, are determinations of the nitrogen content of the blood in one combination or another, which is held in the blood normally or in excess in the event of disease, especially of the kidneys, therefore, so-called tests of retention.

Harrison [1] has found the provocative urea concentration most useful. He says that the "urea concentration factor" indicates that sometimes a "normal" or "almost normal" urea concentration in the urine may be due to excessive blood urea, and he demonstrates the importance of estimating simultaneously the urea concentration of blood and of urine. The alleged fallacies of Ambard's urea constant as a functional renal test, demanding its rejection, are universally recognized. Addis [2] finds that by analyzing three samples of blood, drawn periodically while the rate of urea excretion is measured, and dividing the rates of urea excretion per hour by the amounts of urea found in the blood taken in the middle of each period, the level of the curve of blood urea concentration may be more accurately determined. He concludes that, normally, there is approximately fifty times more urea excreted in one hour's urine than is found in 100 c.c. of blood removed during this time, and that this is independent of the actual level of blood urea concentration; furthermore, the depression of the ratio is frequently observed in destruction of actively secreting kidney tissue, although the blood urea concentration remains normal; hence, the superior value of the ratio in the estimation of renal disease. Admittedly, the only knowledge derived from a determination of the residual nitrogen of the blood is the amount present in the blood at the particular moment the blood is taken. If we consider the sources from which these substances are derived, it becomes apparent that they are quite variable. Barát and Heténi [3] point out that doubtless a part is due to retention of nitrogen in the blood itself in consequence of impaired renal function, and a part results from the process of protein decomposition in the tissues. Then there is the possibility of reentry into the tissues of certain nitrogenous and other waste products retained in the blood. Monokow [4] first demonstrated that an increase of residual nitrogen is possible without exogenic accumulation; namely, when there is an excessive decomposition of protein occurring in the organism and secretion is unable to keep pace with the increased requirements. Nitrogen retention, therefore, may be inferred only in those cases in which there is no increased decomposition of protein in the organism. Falte [5] found that, in the case of uremia patients, residual nitrogen is always present in the red blood corpuscles; whereas, normally, these contain not a trace; and he looks on uremia as a poisoning of the parenchymatous cells by nitrogenous products.

Although, for a long time, it has been contended that the positive or negative nitrogen balance is the decisive factor in the determination of the present status and prognosis of renal function, it would seem that enough evidence has been cited above to indicate that the blood biochemical determinations of nitrogen as infallible proof of true urea concentration of the blood and kidney insufficiency must be viewed with grave suspicion. It is not uncommon to note certain incongruities or serious discrepancies between the clinical aspect of cases and laboratory analyses. Experience,

TABLE 1.—NORMAL KIDNEY CASES

	Indigocarmin								Blood Chemistry			
	Intramuscularly				Intravenously							
Case	Date	Onset in Min.	Quantity in 3 Hrs., per Cent.	Index	Date	Onset in Min.	Quantity in 1 Hr., per Cent.	Index	Date	Urea Nitrogen, Mg. per 100 C.c.	Total Nonprotein Nitrogen, Mg. per 100 C.c.	Comment
1. B. M.	1/ 7/17	10	24.5	4.0	.....	..	.....	....	1/ 8/17	15	30	Bilateral epididymitis; urine neg.
2. Z.	5/ 9/17	10	23.31	3.5	.....	..	.....	....	5/ 9/17	10	31	Spermatocystitis; urine negative
3. H. C.	1/ 7/22	10	31.26	2.01	1/11/11	4½	54.13	3.79	1/ 7/22	12	30	Gonorrheal arthritis; urine neg.
4. G. B.	1/ 9/22	13	23.88	3.84	1/14/22	4	35.57	4.49	1/ 9/22	11	27	Inguinal adenitis; kidneys normal
5. O. C.	1/10/22	10	45.16	4.22	1/16/22	5	62.97	4.35	1/10/22	13	30	Inguinal adenitis; kidneys normal
6. J. B.	2/20/22	8½	19.52	2.73	2/11/22	3½	50.69	3.15	2/20/22	11	29	Urethral stricture; kidneys normal
7. B. S.	2/21/22	7½	39.74	4.12	2/11/22	4	48.99	4.67	2/21/22	12	30	Chronic urethritis; kidneys normal
8. C. N.	2/25/22	10½	28.21	1.82	2/13/22	6½	36.6	2.85	2/25/22	10	30	Chronic urethritis; kidneys normal
9. J. S.	2/27/22	9½	17.41	3.29	3/10/22	6½	34.53	3.44	2/27/22	10	26	Chronic urethritis; kidneys normal
10. J. M.	10/ 3/21	..	10.5	3.12	10/ 6/22	6	45.63	2.53	10/ 3/21	22	27	Lumbago; urine negative; indigocarmin intravenously 10/3/22, 4 right, 3½ left, cystoscopically
11. A. C.	2/ 4/16	10	15.96	1.9	.....	..	.....	....	1/31/16	18	..	Epididymitis; urine cloudy with albumin, hyaline casts
12. W. J.	3/ 4/22	..	36.5	1.2	.....	..	.....	....	3/ 3/22	15	32	Syphilis; neo-arsphenamin reaction; urine: specific gravity 1.008; no albumin, sugar nor casts

* Read before the Section on Urology at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.

* Because of lack of space, this article is abbreviated in THE JOURNAL, by omission of most of Table 2. The complete article appears in the Transactions of the Section and in the author's reprints.

1. Harrison, G. A.: On Urea Tests of Renal Function, Brit. J. Exper. Path. **3**: 28 (Feb.) 1922.

2. Addis, Thomas: Determination of the Extent and Nature of the Renal Lesion, in Bright's Disease, California State J. Med. **20**: 90 (March) 1922.

3. Barát, and Hetényi, Géza: Nonprotein Nitrogen in the Blood and Tissues in Renal Diseases, Deutsch. Arch. f. klin. Med. **138**: 154 (Jan.) 1922.

4. Monokow: Quoted by Barát and Hetényi, Footnote 3.

5. Falte: Quoted by Barát and Hetényi, Footnote 3.

on the other hand, has demonstrated beyond question that the blood chemical tests, either alone, collectively or in conjunction with certain of the tests of elimination, are of great, if not indispensable, value in the estimation of renal function and surgical risk. Quantitative metabolic study, concededly, is the most accurate test of kidney function; but, because of its impracticability, at least for the surgeon, it has long since passed into the discard. It is with righteous concern, therefore, that the urologic surgeon views the work and recommendations of Addis[2] whereby the determination of urea concentration becomes further complicated. Certainly, the laboratory determinations of nitrogen retention in the blood are already sufficiently technical, laborious and time-consuming; and, unless it can be shown that these retention tests possess decided value and advantage over certain of the tests of elimination, it becomes questionable whether they merit the confidence at present reposed in them. All things being equal, the most practical test is the best and is the one that will survive the longest. We are convinced that the time will never come when any functional kidney test will be found infallible, or when reliance can be placed, without exception, on a single one to the exclusion of all others. Obviously, none of the tests of elimination, dependent on examination of the urine, necessarily obtained by catheter, can be relied on or utilized in all cases, notably those possessing impassable or forbidden urethras. Under such circumstances, one or more of the blood chemical tests admirably supplies the required information and invariably suffices to determine satisfactorily the degree of blood urea concentration and functional activity of the kidneys.

It is our purpose to compare the findings of the indigocarmin functional kidney test with those of three of the commonly employed blood chemical tests: urea nitrogen, total noncoaguable nitrogen and creatinin. We have never claimed that indigocarmin is the best agent for the determination of combined kidney function, but we believe that, when properly employed, it is superseded by no other. Moreover, in unilateral determinations and from the standpoint of practicability and reliability, in many instances, it has no peer; for, in not a few cases, we have employed it with satisfaction when no other test was applicable.

The present comparative study comprises a review of these functional tests in a series of patients with supposedly normal kidneys (Table 1), and a series of pathologic cases embracing diverse affections of the urogenital tract (Table 2). One, two or occasionally all three of the biochemical blood tests have been applied to each patient, usually on the same day that indigocarmin was employed, although this has not been possible in many instances, which may account for certain disparity in the results. In the employment of indigocarmin, three methods of injection have been practiced: the intramuscular, the intravenous and the cystoscopic. By the last is meant chromo-ureteroscopy, or the observation of the onset of the elimination of the dye from the respective ureteral orifices, following intramuscular or intravenous injection. Obviously, this may be combined with the quantitative determination of the dye, intramuscularly or intravenously. In our employment of indigocarmin, if possible three factors are considered in estimating the functional activity of the kidney: the onset of elimination, the quantitative output and the index of elimination; and greatest of these is the index. It is the most important because its determination depends on the onset of elimination and the quantitative output for alternate periods. It is a well-recognized fact that, in the event of damaged kidneys, the onset of the dye excretion is delayed, its quantitative output diminished, and its duration of elimination prolonged. Therefore, the quantity collected during the third part of its period of maximum elimination may, and in the case of damaged kidneys usually does, exceed that for the first third of this period. The average normal in ambulatory persons is approximately five times as much in the first as in the third part of this period. In inactive or bedridden patients, this ratio may fall as low as one. Any value

TABLE 2.—PATHOLOGIC CASES

	Indigocarmin, Intramuscularly				Blood Chemistry				
Case	Date	Onset in Min.	Quantity 3 Hrs., per Cent.	Index	Date	Urea N., Mg. per 100 C.c.	Total N. P. N., Mg. per 100 C.c.	Creatinin, Mg. per 100 C.c.	Comment
1. S. R.	8/ 8/15	20	12.78	1.9	8/ 8/15	..	42	...	Prostatic hypertrophy; residual urine, 14 ounces; prostatectomy; recovery
	8/10/15	20	21.83	1.8	8/10/15		32		
2. J. H.	12/23/15	8	24.85	5.1	12/24/15	10	..	...	Prostatic hypertrophy; prostatectomy; recovery
3. M. T.	4/ 3/16	23	2.75	1.3	4/ 3/16	23	..	...	Prostatic hypertrophy; prostatectomy; recovery
4. W. H.	12/28/15	16	26.14	0.4	12/29/15	..	33	...	Prostatic hypertrophy; prostatectomy; recovery
	12/31/15	13	26.20	2.9					
5. S. C.	2/10/16	20	20.07	1.07	2/ 7/16	22	64	...	Prostatic hypertrophy; prostatectomy; recovery
	2/21/16	18	21.56	4.06	2/17/16	18	56		
6. W. B.	3/17/16	85	6.16	0	3/13/16	..	81	...	Prostatic hypertrophy; prostatectomy; recovery
	3/27/16	40	13.51	0.5	3/18/16	30			
	4/ 8/16	18	17.38	1.5	3/27/16	..	67		
					3/28/16	18	..	2.2	
					4/ 6/16	..	60		
					4/ 8/16	19			
					7/12/16	28	58	3.2	Prostatic obstruction; prostatectomy; recovery
7. E. K.	7/12/16	61	11.58	0	7/24/16	10	34	2.8	
	7/24/16	16	25.20	1.5					
8. S. B.	8/15/16	33	34.33	2.1	8/16/16	26	44	...	Prostatic hypertrophy; urine normal; prostatectomy; recovery
9. W. S.	9/25/16	11	29.54	1.4	9/25/16	8	22	...	Prostatic hypertrophy; prostatectomy; recovery
10. R. P.	10/18/16	50	16.56	1.0	10/18/16	11	56	...	Prostatic hypertrophy; prostatectomy; recovery
	10/26/16	10	21.4	2.8	10/26/16	8	40		
11. B. B.	10/25/16	22	25.40	1.5	10/25/16	18	..	...	Chronic prostatitis and hypertrophy; prostatectomy; recovery
12. G. L.	1/18/17	55	19.28	1.3	1/17/17	24	44	...	Prostatic hypertrophy; myocarditis; blood pressure: systolic 240, diastolic 165; hyaline and granular casts; died
13. A. G.	5/30/17	26	14.50	1.2	6/ 4/17	17	..	...	Prostatic hypertrophy; prostatectomy; recovery
14. J. R.	5/27/19	35	5.9	0.33	5/25/19	24	..	...	Prostatic hypertrophy; blood pressure: systolic 175, diastolic 125; myocarditis; prostatectomy; died
	5/30/19	18	11.74	0.39					
	6/ 2/19	14	16.4	2.59					
15. H. M.	5/26/19	11	4.22	?	5/25/19	21	..	...	Prostatic hypertrophy; paralysis agitans; no operation

below one places the patient in the negative phase and contraindicates surgical intervention, except at great or unwarranted risk.

We believe that the index of elimination of indigocarmin furnishes, from a single determination, a more reliable guide as to the stability of renal function than any single quantitative determination for the entire period. It is true that the stability of function may be gaged also by comparative repeated quantitative determinations; but the index estimated conjointly portrays even more graphically the rise or fall into the positive or the negative phase of renal activity and surgical risk.[6] It would also appear that the mere onset of elimination of the dye parallels precisely the nitrogen retention tests, and would seem to be of equal value were it possible always to determine the true onset; but accidents interfering with catheter collections are prone to occur, and necessarily mar or nullify the results. In order to overcome certain objections to the intramuscular method, namely, catheter tolerance, for three hours, and its attendant mishaps,[7] muscular pain and subsequent tenderness associated with the intragluteal injection of 20 c.c. of solution and an unnecessary consumption of time, we recently have been estimating the index following intravenous injection, employing one quarter of the intramuscular amount, or 5 c.c. of a 0.4 per cent. solution of indigocarmin; and I can report that the results are even more satisfactory than with the intramuscular method. Intravenously, the specimens are collected at intervals of twenty minutes, instead of hourly as is necessary for the intramuscular use of the dye, and the index is determined by taking the ratio of the first and third twenty-minute outputs. The comparative values for normal kidneys may be judged by reference to Table 1, and the close parallelism between the intramuscular and intravenous indexes noted. Parenthetically, it should be stated here that we have in course of publication an article[8] showing that phenolsulphonephthalein, for those who prefer its use, can be utilized with equal if not superior advantage in the determination of the index of elimination.

A review of Table 1, showing normal cases, reveals a strikingly close parallelism between the results of the indigocarmin and the blood nitrogen retention tests. Intramuscularly, the dye appeared (by catheter) in from seven and a half to ten and a half minutes. The percentage output for three hours varied from 10.5 to 45.16. The index ranged from 1.2 to 4.22. Intravenously, the onset (by catheter) occurred in from three and a half to six and a half minutes. The percentage output, for one hour, varied from 34.53 to 62.97. The index ranged from 2.53 to 4.67. Cystoscopically, after intramuscular injection we have observed the dye appearing at the ureteral orifice in three minutes, and as early as two minutes following intravenous injection. If it does not appear in twenty minutes after intramuscular injection, or in ten minutes after intravenous administration, the kidney should be regarded, probably, as functionally insufficient or seriously diseased. The estimations for blood urea nitrogen varied from 10 to 22 mg. per hundred cubic centimeters; those for total nonprotein nitrogen from 26 to 32 mg. per hundred cubic centimeters of blood.

Neither time nor space permits a detailed critical review of the ninety pathologic cases tabulated in Table 2. Suffice it to say that the parallelism existing, excepting in a few instances in which errors crept in to mar the results, between the values for indigocarmin intramuscularly, intravenously or cystoscopically, and those for the three blood biochemical tests employed, is most striking. A careful analysis of the tabulated cases will reveal the fact that indigocarmin, as employed, has proved itself eminently reliable as a gage of kidney function; also, that the three blood chemistry tests likewise have proved their reliability; that of these, if there be any choice, urea nitrogen is probably the most practical and best; that, if a supplementary or confirmatory test to indigocarmin or one of the elimination tests is indicated, as is not infrequently the case, one of the blood biochemical tests, notably the urea nitrogen should be employed; that both tests of elimination and retention are indispensable for the proper and best conduct of our work, and that if the values for indigocarmin are found to be normal, any other test is superfluous.

116 South Nineteenth Street.

6. Thomas, B. A.: The Rôle of Functional Kidney Tests and Preoperative and Postoperative Treatment in the Reduction of Prostatectomy Mortality, J. A. M. A. **63**: 1909-1915 (Nov. 28) 1914.

7. Too much emphasis cannot be laid on the necessity for the accurate collection of specimens of urine during the period of elimination of indigocarmin. Improper catheter drainage or block must be avoided and, at the termination of the hourly or twenty minute periods, an experienced attendant must make certain that the bladder is emptied as completely as possible. It is our practice to require that the person making the colorimetric quantitative readings record and report back with the colorimetric findings the exact amount of urine collected for each of the three periods and sent to the laboratory. This serves as a valuable check in locating and rectifying errors of technic, which otherwise may render the results worthless.

8. Thomas, B. A., and Min Hsu, W. I.: Studies on the Output of Indigocarmin and Phenolsulphonephthalein After Intravenous and Intramuscular Injections; With Special Reference to the Index of Elimination as a Control of Surgical Risk, Urol. & Cutan. Rev., to be published.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. BERGLUND, OLMSTED AND CAULK, FRONTZ AND GERAGHTY, SQUIER, BANDLER AND MYERS, AND THOMAS

DR. L. G. ROWNTREE, Rochester, Minn.: When depending on the urea method alone, it is essential to run controls occasionally, a procedure too often neglected. Urea is not always as active as it might be. But for general purposes, I believe that blood urea is the most useful and practicable of the various blood determinations. All of our work goes to confirm the results of Myer and Chase. The relative ease with which urea, creatinin and uric acid are excreted is of peculiar significance. Uric acid is the first to accumulate. I believe that I have seen at least one case of gout of renal origin due to the inability of the kidney to excrete uric acid. Creatinin is the most significant from the prognostic point of view. The blood urea is subject to change from the standpoint of diet and so forth, which failed to affect the creatinin level. In 1,500 cases studied at the University Hospital, Minneapolis, there were seventy-three cases with 5 mg. or more and thirteen with 10 mg. or more of creatinin for each 100 c.c. Of these thirteen patients, nine died in the hospital under observation, and three of the others died within three or four months after leaving the hospital. Twelve of the thirteen died inside of four months. The only patient to recover was one on whom prostatectomy was performed. This patient was in fair condition, with fair renal function at the end of a year. I have followed one patient with chronic nephritis, who has lived one and one-half years subsequent to the creatinin peak reaching 16 mg. for each 100 c.c.; but this is extremely unusual. The carbon dioxid combining power of the blood is of importance in relation to acidosis and alkalosis. Dr. Tucker became interested in a form of nephritis which is encountered sometimes subsequent to gastro-enterostomy. It is related in some way to duodenal stasis, and may develop under either the surgical or the medical care of ulcer. It is characterized by renal insufficiency, and a tendency to alkalosis and to tetany. Edema is usually absent. The blood chemistry is character-

ized by the usual evidences of renal insufficiency by a high carbon dioxid combining capacity of plasma and a low chlorid content. Pathologically, it is a degenerative process. Recognition of certain principles has played a part in this progress. Fixation of urine accompanies renal insufficiency: the loss of ability of the kidney to dilute and concentrate the urine. This is of great importance in nephritis. In testing this function, we have utilized as a routine the methods as outlined by Volhard and Fahr. Fixation occurs in disease; also in relation to the excretion of acid and alkali. Leathes has shown that in health there is a constant morning alkaline tide, and that this is affected in acute nephritis. McCorvie has found that in chronic nephritis also the alkaline tide is decreased or absent, and in some instances he has encountered instead an acid tide. Three or four patients showing this phenomenon died. Marshall and Davis showed that urea is distributed in apparently the same concentration throughout all the tissues of the body, with the exception of fat, bone and skin. Dr. Hench has been interested in the distribution of urea in the various secretions of the body. His findings in relation to saliva are of unusual interest. When urea accumulates in the blood in renal insufficiency, it is excreted in increasingly larger quantities by way of the saliva. Whereas, normally, the combined urea and ammonium nitrogen of the saliva is not more than 13 mg. for each 100 c.c., in uremia it may exceed 150 mg., indicating a salivary urea of more than 300 mg. Since urea is subject to hydrolysis, the combined nitrogen rather than the urea nitrogen is determined. The saliva may yield all the information necessary relative to urea retention. Hench's work promises to be of practical importance to medicine.

DR. WILLIAM ENGELBACH, St. Louis: We all agree as to the absolute value of these tests, particularly in the chronic types of kidney disease, or in any condition in which the kidney is affected secondarily, as it frequently is in genito-urinary conditions. I was struck early in the development of these tests, however, with the very good apparent function, or, at least, the very good ability the kidney had to excrete dyes and to take care of the retention products in the acute renal lesions seen so frequently by general practitioners and internists. One is surprised in these very acute cases in which there is a classical urine with casts, etc., that the phenolsulphonephthalein test will be practically normal. That is true in all cases, but in quite a number a repeated blood nitrogen test runs below 30. I think that bears out to a considerable extent the course and duration we may expect in those cases. As long as we have these normal blood products and normal dye excretions, we can feel pretty sure that the prognosis is not particularly bad. In these acute cases, these specific estimations can be used as indicative of the prognosis more than of the actual damage of the kidney lesion. We are very fortunate in having these aids in the chronic cases in which we have the so-called negative urinary findings, although if we go into the detailed interpretation regarding kidney function we certainly have a good deal of evidence on which to make a diagnosis of at least a renal cardiovascular lesion.

DR. HUGH CABOT, Ann Arbor, Mich.: This group of papers seems to show two things: the amount of work being done, and the very general agreement between the men who have been studying the problems. Those examinations that can be carried out only by the very specially equipped laboratories are of little value to the general medical man. It has been clearly brought out that of the various tests of blood nitrogen, one, on the whole, is far superior for most purposes to the others, and that is the determination of urea. I entirely agree that the phenolsulphonephthalein test of Rowntree and Geraghty, and the test for blood urea, are the tests most valuable for the physician in general medicine, and that those two tests do not test the same thing. It has been brought out very strikingly that the phenolsulphonephthalein test will show changes in the kidney which have been going on for a very short time, a time at which changes in the blood will not occur. There is, I think, among many who are using the tests a tendency to regard changes in blood chemistry as of far more importance than is usually the case. For instance, a high blood urea does not necessarily mean a bad prognosis for the patient if properly handled. The prognosis does not depend on what the blood urea is today but what it will be a week or a month from today under appropriate methods of treatment. It is not a contraindication for operation, except at a particular time or by a particular method. Trivial operations may be done; for instance, suprapubic opening of the bladder, when the use of the in-lying catheter is for some reason not to be considered. We cannot give a prognosis in the sense that we might were we dealing with the question of chronic nephritis. It is a very different problem and one not to be measured by examination on any one occasion. I do not find myself able to go the distance with Dr. Thomas, for it appears to me that with the phenolsulphonephthalein test we have a method that is more easy of management for the patient, less unsettling both to his consciousness and to his insides, and, on the whole, more accurate—not subject to so many variations. There is a definite field in which this test is of value, but not so much as a test of the condition of the kidney as an aid to finding ureter orifices. I find that my young associates resort to the use of the indigocarmin test more than I do. It is of value as an aid to the cystoscopist, but not, I think as a test of kidney function.

DR. VICTOR C. MYERS, New York: The phenolsulphonephthalein test beautifully supplements the various blood tests. This is particularly true in cases in which there is no urinary obstruction. The surgeon or internist who cannot personally give attention to the details of the collection of the urine may occasionally be misled by the test, however, and, partly for this reason, it is possible to place greater reliance on the blood findings. Dr. Berglund has presented some data which I think we shall appreciate better after a few years than we do now, just as we appreciate the work of Folin better now than we did ten years ago. Both Dr. Rowntree and Dr. Cabot have referred to the necessity of having the various tests controlled. This cannot be overemphasized. It occasionally happens in the urea determination, which is the most useful one urologically, that the urease is inactive. I have had people tell me that they were getting figures around 8 and 9 mg. Most likely their difficulty was in the urease. In any case urease preparations should be controlled with pure urea. Blood chemistry requires very careful work, and persons who do not understand biochemistry should not undertake these determinations. Dr. Rowntree mentioned the fact that the urea of the saliva has the same concentration as in the blood. We have also made this observation, but it seems that the saliva also contains some ammonia, and this is a factor that may need to be taken into account. As Folin and others have pointed out, the blood contains only a mere trace of ammonia. It may be possible, however, to secure information regarding the blood urea in a very few minutes from the saliva. I do not say that this is true, but it may be true.

DR. RUSSELL WILDER, Rochester, Minn.: The point that Dr. Berglund emphasized, namely, that some light was being thrown on the unknown fraction, nonprotein nitrogen of the blood, was extremely interesting.

DR. BENJAMIN S. BARRINGER, New York: In one case, similar to those referred to with high blood urea, a carcinoma of the prostate became very much diminished. Only a very small quantity was passed every little while. The blood urea went up slowly, and in two weeks it had reached 129, and the creatinin was 27 or 28. At that time the patient began to pass a little more urine, and in the course of a week or two the blood picture was very nearly normal. It is interesting to know that any patient could have as much retention as that and still get back to normal. I think if any operation had been attempted at this period, he would have died. He died about two months later. One point in comparison of the blood chemistry with indigocarmin or other determinations, irrespective of what one may be using them for: The blood urea should be more accurate. One draws so much blood, and if the estimation of the chemist is right one may depend on it, while with phenolsulphonephthalein one has 5 per cent. error in the reading. If the house staff is careless, the patient may not have been catheterized to get the specimen, which error invalidates the test if the patient has

residual urine. I think one can depend absolutely on the blood estimation but not absolutely on the phenolsulphonephthalein test; but the safest method is to use both.

DR. GEORGE LEE EATON, San Francisco: The majority of us are competing against the pathologic condition within the animal economy. What are the reasons for these biologic products within the blood? Do we have to use the kidney function alone to determine that they are the signal lights of danger, where on the other hand, we may be confronted with uremic symptoms without any changes in the output of the kidney? Many times these cases with high urea retention will show a high amount of water but a low amount of urea. These papers have touched very little on endocrinology. It was two or three years ago that I tried to stop a hemorrhage of the kidney by using epinephrin, and found it had a vital function on the kidney and on the circulation of the heart. Along that line we carried on experiments in terminal cases in which urea retention was up to 50 or 60, and within a short time after the injection of epinephrin into the kidney by the ureteral catheter the blood tension went down markedly when high. It is remarkable how epinephrin will influence the blood pressure when it is injected into the kidney.

DR. LOUIS E. SCHMIDT, Chicago: In all of this comparative work there has been an effort to establish a method of determining the function of the kidney as well as the retention products of the blood. I have always attempted to bring in the question of some of the physical methods of examination, and I have particular reference to cryoscopy. These papers have demonstrated to me more than ever that cryoscopy is of value. It was originally stated that cryoscopy of the blood was of no value, but it is being admitted today that estimation of blood urea, nonprotein nitrogen, creatinin and sugar are important factors. Frequently, attempts have been made to show a definite relationship between the various retention problems. I am inclined to believe there is none. I believe there is a rather definite relationship between the total blood chemistry, not of the individual retention products, and the blood cryoscopy. When many people object to the period of time that is required in these tests, and as a great deal of this blood chemistry cannot be done except by technicians, I would recommend that blood cryoscopy be done, as it can be carried out with ease and accuracy. There are men who have done blood cryoscopy for thirty years and during all this time have considered it of the greatest value. The most marked exponent is Kümmel of Hamburg. I am inclined to believe that many examinations such as these would add materially to the value of these papers in coming to more definite conclusions as regards the prognosis in cases in which operations are being considered.

DR. HENRY J. SCHERCK, St. Louis: In 1917, in conjunction with Dr. Gradwohl, I read before the American Urological Association a report on forty or fifty cases in which we had attempted to make a definite study between the phenolsulphonephthalein output and the blood chemistry in obstruction conditions of the lower urinary tract. I am glad to hear today that many of the conclusions we reached have been verified. In his early work in experimental nephritis, Folin found a great discrepancy between the phenolsulphonephthalein output and the blood chemical findings. We found the same discrepancies. We reached two conclusions: The phenolsulphonephthalein indicated the function for the moment, and the blood chemistry indicated the real working power of the kidneys. The same opinion was brought out by two of the authors today. Another conclusion was that there are three sets of conditions which would make us pause in accepting the kidney function from the phenolsulphonephthalein test alone. This seems to emphasize the necessity of correlating the two and taking them together. Our observation of the two methods has forced us to the conclusion that the function of the kidney cannot be estimated in surgery, except by the function as shown by the phenolsulphonephthalein test and by blood chemistry together. It is not the immediate knowledge we get from the test that furnishes us the basis on which to decide a reasonable prognosis, but both together and by the repeated use of both in suitable cases. The findings and figures brought out by Dr. Thomas are practically the same as we brought out then; that is, when the creatinin got above 4 we thought and proved and believed that in the majority of cases the death rate would be extremely high, and the knowledge of retention of creatinin is more indicative of danger than the other forms of nonprotein nitrogens.

DR. HILDING BERGLUND, Stockholm, Sweden: The question of the importance of control has been emphasized. Besides the need of checking up the urates, we must also remember that the acidity of the filtrate is to be controlled so that one does not work with a too acid filtrate that kills the rays.

DR. B. A. THOMAS, Philadelphia: I did the best I could to demonstrate what I believed to be the comparative value of indigocarmin versus the blood chemistry tests. I believe I have shown that indigocarmin possesses value the equal of the blood chemistry tests. I have never contended that it supersedes any other test. There are certain things which should place the balance in favor of phenolsulphonephthalein for combined kidney function, but I feel that one can apply indigocarmin to all conditions, surgical and medical, and if I had to select one test to the exclusion of all others I should select indigocarmin. I would call attention to the fact that there are certain surgical conditions, particularly ureteral conditions, in which I believe it is without a peer; also in the determination of the side affected, particularly in tuberculosis of the kidney. I have seen many cases in which it has been impossible to catheterize one or both ureters when no other test has been able to measure up to the requirements as indigocarmin has done.

BONY BRIDGING IN TUBERCULOSIS OF THE SPINE*

ROBERT B. COFIELD, M.D.
CINCINNATI

Bony bridging of the vertebrae in spondylitis has been considered, since the advent of roentgenology, a distinct evidence of the nontuberculous nature of the disease. Hypertrophic changes and bony ankylosis have long been known to occur subsequent to mixed infections resulting from incision and drainage of cold abscesses produced by tuberculous infection, but the fact that such bony changes occur when no drainage has been established has been considered sufficient evidence to rule out tuberculosis, and has been generally accepted as pathognomonic of certain other types of infection. Tuberculous spondylitis has been frequently and necessarily confused with such conditions as spondylitis deformans, traumatic spondylitis and other vertebral affections in their incipience; but as soon as hypertrophic bony changes were manifest, the possibility of the lesion being tuberculous was dismissed and the condition has generally been treated as a nontuberculous disease.

The fallacy of this deduction was first brought forcibly to my attention in November, 1917, when an Italian laborer, aged 24, was admitted to the orthopedic service of the Cincinnati General Hospital complaining of pain in the lower portion of the back and right thigh. Examination revealed a retraction of the right psoas muscle, and rigidity of the lumbar spine, with an inability to bend forward and to the right. A roentgenogram taken on admission revealed bone destruction in the bodies of the second and third lumbar vertebrae, with a distinct bony bridge extending from the second to the third lumbar on the right side. Soon after admis-

* Read before the Section on Orthopedic Surgery at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.

sion, a cold abscess developed in the psoas sheath; this was aspirated with aseptic precautions and the pus was inoculated into a guinea-pig, which promptly developed tuberculosis.

This and similar cases [1] led to a more careful observation of other patients suffering with spondylitis, whose

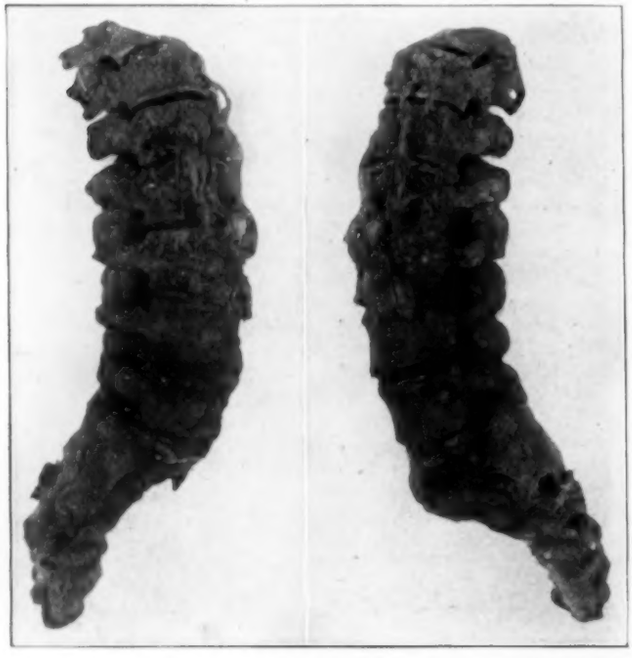

Fig. 1.—Two views of a case of tuberculosis of second lumbar vertebra, with abscess from which tubercle bacilli were obtained before secondary infection had occurred; bony bridging and periosteal production of new bone.

roentgenograms revealed the presence of bony bridging previous to aspiration or drainage of the cold abscess, and also in others who never de eloped an abscess, yet in whom the true tuberculous nature of the disease was substantiated by every other sign and symptom present. In at least one out of every ten cases of tuberculosis of the spine, the roentgen ray disclosed a deposit of lime salts projecting from the body of the diseased vertebra or joining it with its fellow in the form of a bony bridge.

It appears that bony bridging in tuberculosis of the vertebrae most often occurs from a calcareous deposit in either an anterior or a lateral intervertebral ligament, which presents in the roentgenogram a hornlike protrusion springing from the edge of the diseased vertebral body and extending toward the one adjacent to it, or which may form in the middle portion of the intervertebral ligament and extend in both directions until the vertebrae are united. Bony bridging of the vertebrae may occur also by a process of periosteal production of new bone extending from the body of one vertebra toward its adjacent fellow, and this process may extend until it completely encapsulates the disk, producing a solid external fixation of the two vertebrae. It has also been observed that bridging is not necessarily confined to the region in which the carious destruction has taken place, but may unite two or more of the vertebrae on either side of the tuberculous lesion.

Analogous conditions in other joints affected by tuberculosis are not so often observed; however, we do occasionally see an attempt at bony fixation by calcification of the ligaments or tendons which control the diseased joint; this is especially true of the knee joint.

There are many factors which may influence the production of new bone in tuberculosis of the spine. It has not been observed in children, the youngest patient having been 23 years of age and the oldest 60. There is no evidence that the human or bovine types differ in this respect, but the virulence of the tubercle bacillus or the immunity and resistance of the individual may play an important rôle. It is doubtless true that many cases of tuberculosis of the spine among the laboring class, who have superior physical strength, develop slowly and often go unobserved for prolonged periods. This may be a contributing cause, or the bridging may explain why these cases remain symptomless. Hypertrophic bone changes occur coincident with low grade, chronic infections; and, since tuberculous infection of the vertebrae frequently simulates very closely some of the other chronic infections, there is no reason why similar pathologic changes may not take place.

It is a common observation that mixed infections will often cause hypertrophic changes to occur in tuberculous lesions of the spine; may it not also be possible for a similar condition to result from secondary infection originating from some septic focus harbored in the body and carried by the blood stream in like manner as the tuberculous infection, and thereby find lodgment in the diseased vertebra? Thus, the patient may be harboring two entirely different infections at the same time, one prone to produce an atrophic arthritis, and the other hypertrophic changes in the diseased articulation.

It is possible that the spinal articulations react differently to infection and inflammation than to other joints of the skeletal structure. Presumably the same type of infection produces hypertrophic arthritis of the hip

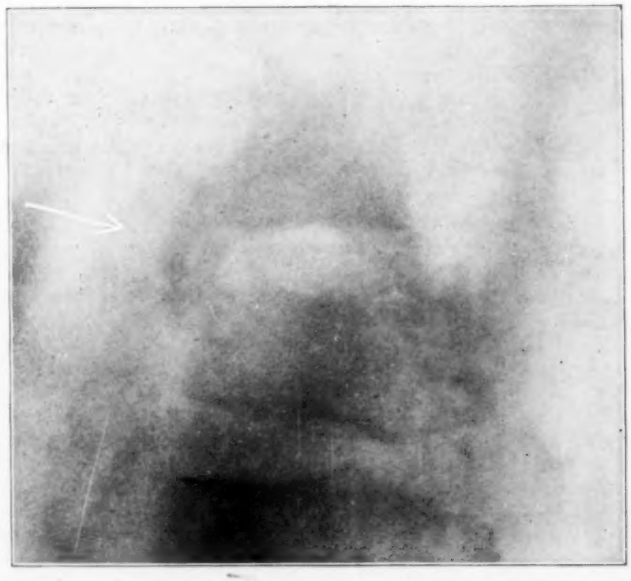

Fig. 2.—Calcareous deposit in anterior intervertebral ligament in tuberculosis of lumbar spine.

and knee joints that produces ostearthritis of the spine. However, the hip and knee will be limited in motion only by the mechanical obstruction produced by the hypertrophic changes about the joint, but the spine will be firmly ankylosed, producing a poker back. Is it not possible, therefore, that the same type of infec-

1. Cofield, R. B.: J. Bone & Joint Surg. 4: 332-341 (April) 1922.

tion may at times produce a different reaction in different regions of the body? Since that portion of bone lying in close relation to the periosteum possesses the greatest osteogenic function, it is possible that a tuberculous inflammation occupying the superficial portion of the vertebra will be more likely to be productive of new bone than a lesion farther removed from the surface. The location of the lesion in the vertebra, therefore, may be a determining factor, especially in the periosteal production of new bone.

There is still another factor which may have a very important influence on the production of new bone in the region of diseased joints; that is, the mechanical or static influence. Any chronic inflammatory process produced by an actual or referred injury calls forth a series of changes with an attempt to repair. Bone growth ceases only because its development has produced a structure such that mechanical stimuli no longer influence it to grow; but if one places unusual strain on bones, unusual development will at once take place. Bony bridging in tuberculosis of the spine has been most commonly observed to occur in the region of the dorsolumbar and lumbar vertebrae. It is possible, therefore, that this unusual attempt to repair is seen most frequently in the dorsolumbar region because this particular portion of the spine sustains the strain of greatest weight bearing and motion.

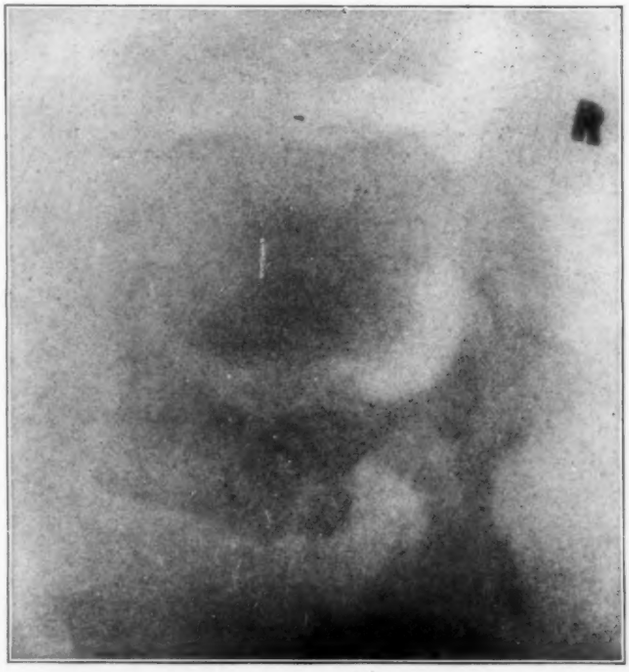

Fig. 3.—Tuberculosis of third lumbar vertebra, with anterior bony bridging between second and third lumbar vertebrae.

It makes little difference whether bony bridging in spondylitis is produced by the tuberculous infection or by some other agency acting in conjunction with it; the fact remains that certain cases of spondylitis which present bony bridging are tuberculous in character, and the presence of new bone is not sufficient evidence to rule out the possibility of a tuberculous lesion.

ABSTRACT OF DISCUSSION

DR. F. C. KIDNER, Detroit: The further we go in the diagnosis of bone lesions, the less we can say about their appearance in the roentgenogram. The same lesions vary much in appearance. At the same time, it is unfair to say that, because we have not the typical appearance in the spine, we are not dealing with tuberculosis. Many other factors may enter. Traumatism may produce a calcified area of bone or ligaments and, as Dr. Cofield said, infection somewhere else may produce an overgrowth of bone in the region of the tuberculosis. We ought to keep our feet on the ground in these cases and remember that most tuberculosis does not show hypertrophic overgrowth. If we do not, we are going to be in great danger of diagnosing tuberculosis when it really is not there at all.

DR. WILLIS C. CAMPBELL, Memphis, Tenn.: Unquestionably, bone tissue may react in a similar manner to different irritants. Mr. Fraser pointed out a number of years ago that we might have new bone formation in tuberculosis of the bone. Consequently, it is quite possible that these spurs may be associated with tuberculosis. In fact, I have seen spur formation not only in tuberculosis but also in other atrophic types in spondylitis. In 1916 I described a certain type of local spondylitis that gave very similar symptoms to tuberculosis. I am absolutely sure that the type that was mentioned by me was not tuberculosis. There was no atrophy whatever in the bone. It was apparently an infection of the intravertebral disks. The condition is very acute and often follows an acute infection such as pneumonia or typhoid fever. A typhoid spine may show spur formation. I am equally certain that there may be an overgrowth of bone and osteophytes in tuberculosis. I do not think that it occurs with any degree of frequency, but I am positive, from my own experience, that such may be the case. However, that the origin is from a secondary focal infection, I am by no means certain.

DR. ROBERT COFIELD, Cincinnati: We have been taught that any hypertrophic change occurring in spondylitis is not tuberculous in nature. The twelve cases which I have had all showed definite bony bridging and, by every means possible in making the diagnosis, we were as certain as we reasonably could be that they were tuberculous cases. I have no proof, however, of the different factors which I mentioned in the paper as being the causation of the bony bridging other than the tuberculosis. I firmly believe that tuberculous infection in the vertebrae can of itself produce bony bridging, almost the same type of bony bridging we see in hypertrophic arthritis or osteoarthritis, as it is often termed. After an Albee bone graft operation, a bridge connecting the vertebrae on the anterior surface was noted, showing that more than the Albee bone graft helped to stabilize the spine. I would not hesitate, however, to do a fixation operation, an Albee or other spinal fusion operation, even though there was some bony bridging, because I do not believe the bridge is always of sufficient strength to produce the fixation that we like to see in the spine in order to accomplish a cure quickly. Many of these patients have had abscesses, and I have attempted in practically all cases to find the tubercle bacillus and other organisms in the pus. In only two cases have I been able to isolate the tubercle bacillus, and in none have I been able to isolate any other organisms.

Cholera and Plague in 1921.—The *Klinische Wochenschrift* cites some recent official data which state that Australia and America escaped cholera during 1921, while there were 150,000 fatal cases in India and 180,000 known cases of cholera in Russia. Germany had some laboratory infections at Königsberg. British India paid the heaviest tribute to plague, with 125,000 fatal cases. Netherlands India reported 10,000 deaths from it in Java alone; Indo-China, 1,000. Manchuria was affected more than the rest of China, and there were 356 cases in Eygpt and 1,789 in the Senegal. Small foci developed in certain South American countries and the Azores and Australia also had cases. A few cases, up to 14 at Constantinople, were observed at Naples, Rome, Venice, Lisbon, Paris and Clichy on the Seine.

THE CIRCULATION OF THE CEREBROSPINAL FLUID

ITS IMPORTANCE IN ACUTE CRANIAL INJURY *

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Within the last decade, much progress has been made toward a better understanding of the origin and circulation of the cerebrospinal fluid. During the last three or four years, this knowledge has enabled the open-minded student of surgical pathology to correlate the antemortem and the postmortem findings in acute cranial injury, with the result that a more rational theory of pathogenesis and a more successful method of treatment have been evolved for these hitherto troublesome and refractory cases.

I shall endeavor, in this paper, to review our knowledge of the cerebrospinal fluid circulation, and to show the effect of cranial trauma on it. I shall then indicate what appears to me to be the best method of treatment for its relief. This study is based on my observations of more than 400 cases of brain injury, at the Cook County Hospital, during the last three years.

THE CEREBROSPINAL FLUID

Sources. — Although the origin of the fluid that is found within the ventricles and aqueducts of the brain, and of that bathing the surface of the brain in the subarachnoid spaces, has long been in dispute, most authorities agree today that its chief source is an active secretion of the choroid plexuses. This secretion may receive accretions from the ependymal cells lining the ventricles, from the pituitary body, and from metabolic products of the brain cells themselves, through their perivascular channels.

Circulation.—For a long time it was thought that the cerebrospinal fluid acted mechanically only as a water bed for the brain to preserve it from injury within the unyielding bony walls of the cranium; that its amount remained more or less stationary, much as the lubricating synovial fluid in a joint. The cerebrospinal fluid, however, also has a definite circulation through a regular pathway which leads from the ventricles by a series of aqueducts, flumina and cisterns toward the cerebral sinuses, into which it empties.

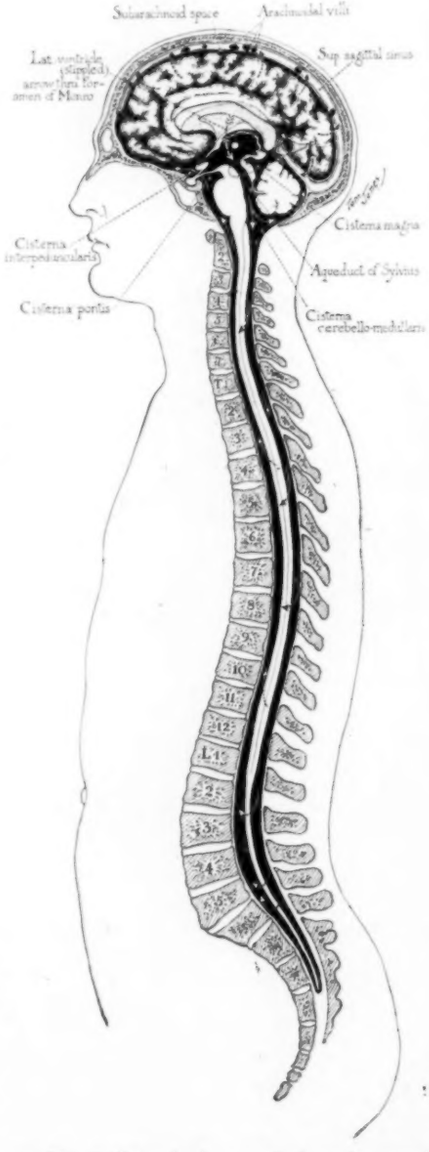

Fig. 1—Lateral view, sagittal section, semidiagrammatic, of cerebrospinal subarachnoidal spaces; direction of circulation of fluid indicated by arrows.

From its origin in the lateral ventricles, the fluid passes through the foramina of Monro to the third ventricle, and thence along the aqueduct of Sylvius to the fourth ventricle, where it escapes through the terminal opening of Magendie and the lateral clefts of Luschka to the subarachnoid spaces at the base of the brain beneath the tentorium cerebelli. Here are located the large cisterns of the pons, medulla and cerebellum, which are susceptible of great dilatation when the paths of absorption above the level of the tentorium are obstructed. From these cisterns the fluid follows two main paths. The larger part rises over the surface of the midbrain through the narrow incisura tentorii to bathe the surfaces and sulci of the cerebrum and to receive accretions from its perivascular channels; it finally is mainly absorbed into the large venous sinuses through the mechanism of the arachnoid villi (pacchionian bodies). A small portion is absorbed by lymphatics along the cranial and spinal nerves.[1]

Another smaller portion descends along the ventral aspect of the spinal cord to the cauda equina, and returns along its dorsal aspect to augment that stream which bathes the cerebrum. These two streams along the cord are only partially separated by the ligamenta denticulata and the spinal nerves, between which they communicate along the length of the cord.

Thus it is seen that the main path of circulation is from within the cavities of the brain downward to the cisterns about the medulla, and then over the surface of the midbrain upward through the cleft in the tentorium cerebelli, spreading out over the surface of the cerebrum in the subarachnoid spaces.

Amount of Fluid. — The total amount of fluid is variable and difficult to state accurately; however, it is approximately correct to state that there is, in all, from 120 to 150 c.c., thus distributed: ventricles and aqueducts of brain, from 30 to 60 c.c.; subarachnoid spaces of brain, 60 c.c.; cord, from 20 to 30 c.c. When absorption is interfered with, this amount is increased by continued secretion of the plexuses.

Forces.—While there is no pump analogous to the heart to maintain the circulation, the fluid finds its way about much as does the venous blood from the extremities. There is the force exerted by the secretion of the plexuses. This is materially assisted by gravity and by the pulsation of the brain. It has also been determined that the pressure in the dural sinuses is lower than that of the subarachnoid

* Read before the Section on Miscellaneous Topics at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.

1. For experimental data and bibliography, the reader is referred to the author's article on "The Management of Acute Cranial Injuries by the Early Exact Determination of Intracranial Pressure and Its Relief by Lumbar Drainage," Surg., Gynec. & Obst. **34**: 494-508 (April) 1922.

fluid, so that a negative pressure here is of some assistance.

DISTURBANCES OF CIRCULATION DUE TO TRAUMA

The normal circulation of the cerebrospinal fluid may be interfered with by a number of factors causing obstruction to the flow in any part of its course. For example, tumors, inflammations or parasites may obstruct the aqueduct of Sylvius, or close any of the foramina, and cause a dilatation of the ventricles by the continued secretion of the choroid plexuses. In this paper I shall consider the traumatic causes alone. In 95 per cent. of all severe head injuries with or without the presence of fracture of the skull, there is contusion of the brain or meninges. This is usually of the contrecoup variety, affecting in most cases the cerebrum so that opposite sides of the brain are involved. There always results hemorrhage and swelling of the brain, tending to the obliteration of the subarachnoid spaces. This leads to more or less complete stasis of the cerebrospinal fluid, and its circulation ceases to a greater or less degree, depending on the extent and severity of the trauma.

Hemorrhage. — This may occur in one or more of the coverings of the brain, or within its substance or ventricles. It is most commonly subarachnoidal, less often subpial; occasionally it is subdural or extradural. Extradural hemorrhages, commonly middle meningeal or sinus hemorrhages, are not considered in this paper, as they must be relieved by local measures. They constitute less than 5 per cent. of all cases.

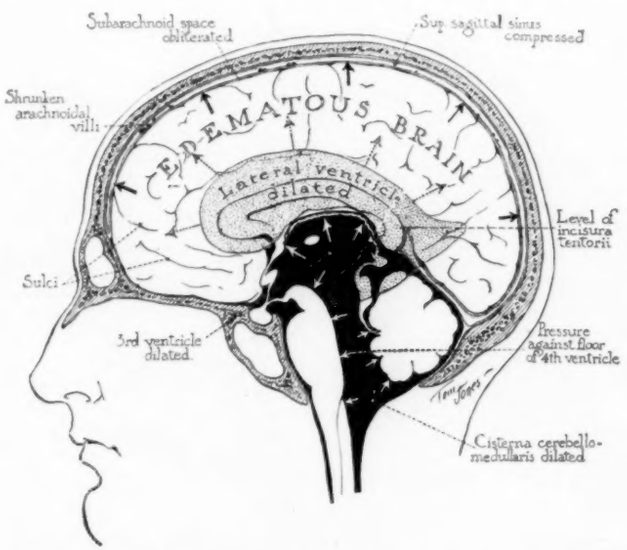

Fig. 2.—Sagittal section of edematous brain. Arrows indicate direction of pressure excited by swollen brain and dilated ventricles. Cisterns below level of the tentorium cerebelli are enlarged. Cerebral subarachnoidal spaces and sinuses are obliterated, blocking absorption of the cerebrospinal fluid.

The location of the hemorrhage, if due to severe impact, is directly under the part subjected to trauma and at a point directly opposite. Thus, a severe blow to the left parietal region also affects the right parietal; a blow to the occiput also shows trauma to the frontal lobes; a blow to the vertex affects secondarily the base of the brain. The amount of blood exuded is not large, as a rule. This is due to the fact that small vessels are usually torn, and that the intracranial pressure, due to swelling of the brain on the nonexpandable dura, serves to stop bleeding early. Forty grams is an average amount even in fatal cases, and amounts of from 1 to 10 gm. are usual. In very severe cases the amount rarely exceeds 100 gm.

If a lumbar puncture is done a few hours after injury, the cerebrospinal fluid is intimately mixed with blood. After twenty-four hours of rest, the cerebrospinal fluid is less bloody, and after three days clear or yellowish fluid is usually obtained by lumbar puncture. In subarachnoid bleeding, the blood is rather evenly distributed throughout the meshes of the subarachnoid tissue, and is not easily drained by local operative measures. Thus it is seen that subdural hemorrhage, per se, is usually not a dreaded complication of cranial injury. Most of the effused blood can be drawn off, in cases seen early, by lumbar drainage. Should any large clot persist in severe cases seen after twenty-four hours, a cyst may develop or adhesions be formed in the organizing clot, but this is not usual.

Swelling of the Brain (traumatic edema).—A common and potent factor in intracranial pressure that has not received the attention it deserves is traumatic edema. It practically always follows trauma. A similar condition, but nontraumatic in origin, may also be seen in the intoxications of uremia and alcoholism. The swelling begins to appear shortly after the trauma, and reaches its maximum in from twenty-four to forty-eight hours. It then subsides gradually, and disappears in from three to seven days in favorable cases. During this time the intracranial tension is raised, and the paths of cerebrospinal fluid circulation are obstructed. Swelling is most pronounced in the vicinity of the areas of contusion. The causes of the edema have been variously interpreted. Perhaps the most important cause is that of swelling of the brain cells and neuroglia tissue analogous to edema following injury elsewhere, with the difference that the brain, being incased in a nonexpandable dura mater under a rigid bony vault, swelling can proceed only to a limited degree, and then only by encroachment on the ventricles and subarachnoid spaces. Then pressure on its vessels must occur. As the arterial circulation is interfered with by continued swelling of the brain and hemorrhage, more or less anemia of the brain occurs. The pressure is further augmented by the inability of the normal excretions of the brain cells to find exit in the perivascular channels.

At operation or necropsy, one notices a general enlargement of the brain. The weight is increased from 25 to 100 gm. The sulci are obliterated; the convolutions appear flattened, and are tightly pressed against the dura mater so that bulging of the brain occurs as soon as the dura is incised, and rupture of the cortex may occur.

If a subtemporal decompression should be performed at this time, any fluid or blood that is imprisoned in the subarachnoid or subdural spaces will gush out under great force at the time of operation. The brain will then bulge into the cranial defect, effectively plugging it, the edges of the bony defect leaving their imprint on the brain substance. The consistency of the brain is decreased, and in extreme cases a sense of pseudofluctuation may even be obtained. The cortical vessels are pale and anemic. On cut section of the brain, one sees a pale, wet surface from which clear fluid exudes.

Microscopically, the tissues appear spread apart by the imprisoned fluid. The cells of the cortex are

hydropic and vacuolated. The perivascular channels are enlarged and engorged with fluid.

As the brain enlarges, it is pressed against the dura more and more until the subarachnoid spaces are obliterated over the cerebrum. The cerebrospinal fluid continuing to secrete in the ventricles, perhaps at a decreased rate due to back pressure, fills first the cisternae at the base of the brain below the tentorium cerebelli. This makes pressure on the medulla and brain stem, forcing it upward and tending to occlude the narrow subarachnoidal spaces in the incisura tentorii. Both of these factors tend to imprison the secretion of the choroid plexuses within the ventricles, causing them to dilate (internal hydrocephalus). The dilatation of the ventricles pressing out in all directions against an already swollen cortex adds to the pressure of the brain against the dura, obliterating any of the subarachnoid spaces that may have escaped the direct trauma. When this stage is reached, complete stasis of the cerebrospinal fluid circulation occurs, and pulsation of the brain ceases.

Unless this vicious circle is broken at a point below the tentorium early enough to relieve the medulla, death must occur. If it is allowed to continue to press on the cortex of the cerebrum even before the medulla is endangered, degenerative changes take place in the anemic cortical cells with resultant gliosis.

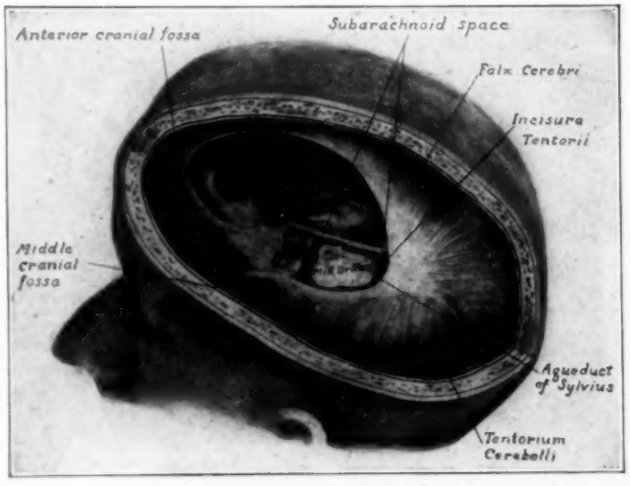

Fig. 3.—Dissection of head to disclose dural compartments above the level of the tentorium cerebelli and the narrow subarachnoid spaces about the midbrain. Subtemporal decompression is performed in the middle cranial fossa, and whatever relief to the medulla is afforded by this operation must come by way of the incisura tentorii.

SYMPTOMS OF ACUTE CRANIAL INJURY

From 80 to 90 per cent. of my cases of head injury are those with contusion of the brain, a large majority being due to automobile and street car accidents. The patients with moderate to severe contusion of the brain usually enter the hospital in shock and are unconscious, with low blood pressure and rapid pulse. It is important to examine for and rule out depressed fracture by direct palpation and by roentgen ray. Linear fractures are the rule, however, and radiate through the anterior, middle or posterior fossae to the base of the brain. In many cases of contusion of the brain, the victims escape skull fracture. There are no further symptoms of cerebral intracranial pressure until the medulla is involved. This takes place after stasis of the cerebrospinal fluid occurs. The symptoms of vomiting, high blood pressure, slow pulse and respiratory difficulty are due to pressure on the medulla, and are comparatively late, unless the injury affects the medulla primarily.

Pressure on the cerebrum indicating hemorrhage and swelling of the brain consequent on contusion can be diagnosed early by determination of the cerebrospinal fluid pressure, as indicated on a manometer attached to the spinal needle inserted for lumbar drainage.

The pressure of this fluid which, as I have shown above, is in direct continuity with the fluid in the basal cisterns, gives one an accurate idea of what is going on within the cranium. A bloody fluid under increased pressure indicates hemorrhage and edema of the brain, and interference with the normal circulation and absorption of cerebrospinal fluid. The normal pressure estimated in millimeters of mercury is from 7 to 9 in the adult and from 5 to 7 in the child. Pathologically, it may rise to 20, 30, 40, 50 and 60 mm. In most of the severe cases of contusions of the brain, it ranges between 25 and 50 mm., or from three to six times the normal pressure. This increase in pressure may be determined within from six to twelve hours after injury, or as soon as the shock of the accident has subsided. To wait until symptoms of pressure on the medulla arise is to allow deadly pressure on the cerebrum for many hours. The gliosis of the cortical cells that follows as little as twelve hours of this pressure anemia is responsible for the many cases of "traumatic neurosis" that we see after brain injury. Early relief, on the other hand, of pressure on the cerebrum not only prevents gliosis, but the symptoms of medullary pressure do not usually appear. The teaching of most of our textbooks regarding symptoms of intracranial trauma are misleading and have been responsible for the poor results obtained by operation in these conditions. Moreover, the operation usually advised, after medullary pressure symptoms appear, is that of subtemporal decompression. As I have indicated above, this operation, supratentorial in location, does not give adequate relief to the cerebrum; nor can it give adequate relief to the medulla, which is infratentorial in location, first, because the operation is usually undertaken too late, and secondly, because of the swelling of the cerebrum, which bulges into the decompression opening. In several cases in which I performed subtemporal decompression, I still found the pressure of the cerebrospinal fluid to be high by lumbar puncture.

TREATMENT

After a careful consideration of the effects of contusion of the brain, with concomitant hemorrhage and edema, on the cerebrospinal fluid circulation, the following method of treatment has been evolved:

1. In all suspected cases of injury to the head, lumbar puncture is performed within six to twelve hours to determine accurately the extent of the injury.

Gas or local anesthesia is used in unruly patients. Most cases require no anesthesia. The patient is placed on the right or the left side on a hard, unyielding surface, with the knees drawn up and the shoulders bent forward. The sagging of a patient in bed may make lumbar puncture difficult. Puncture is made in the median line in the third or fourth lumbar interspace with a sterile needle, the skin having been prepared with iodin and alcohol. The spinal mercurial manometer is held in readiness at the level of the spine by an assistant; the stylet is withdrawn from the

needle and the connection of the manometer immediately attached before any fluid is allowed to escape. Then readings of the intraspinal pressure are taken on the manometer. The escape of even a few drops of fluid lowers the reading considerably. With the technic as described above, I and my assistants have performed, during the last three years, about 1,000 lumbar punctures without danger to the patient. The possibility of herniation of the medulla into the foramen magnum that is present in cases of brain tumors does not obtain in the acute traumatic cases. If the manometer reading is above 12 mm. of mercury the stopcock at the side of the needle is opened and the cerebrospinal fluid is allowed to drain away until the pressure is reduced one half or to normal. I usually withdraw from 10 to 20 c.c. of fluid. In some cases it has been necessary to allow from 30 to 40 c.c. to escape before the pressure reading is reduced sufficiently. While the fluid is being withdrawn, the mercurial manometer remains attached to the needle, and the level of the mercury is seen to descend. Should the fluid be bloody, hemorrhage is indicated. Increased pressures remaining after the fluid becomes clear indicate that the edema of the brain has not wholly subsided. Withdrawal of fluid can be made every twelve to twenty-four hours, depending on the height of the original pressure found and also on the rapidity with which it reforms after each drainage. I have tapped on six to eight successive days, in severe cases, each time succeeding in permanently reducing the pressure from 4 to 6 mm. Then I have repeated the puncture every second or third day until the pressure finally remained normal. In most cases of severe grade, this can be accomplished within ten days. The patients are kept in bed for two or three weeks after the spinal pressure has become normal. Headaches and stupor are relieved by the withdrawal of fluid in these pathologic states. I have never seen a recurrence of hemorrhage after lumbar drainage with the technic I have described; instead, the fluid appears less bloody with each puncture.

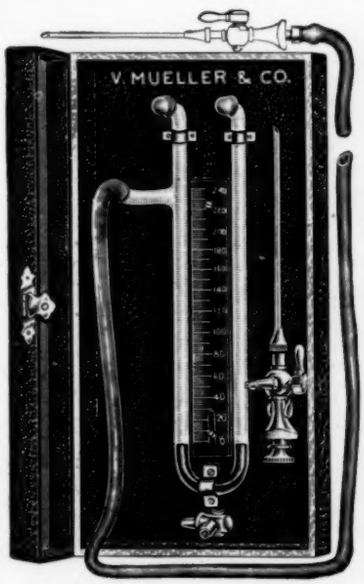

Fig. 4.—Spinal mercurial manometer and spinal needle with two-way stopcock.

The late results of this method of treatment are of importance. I have followed many of my cases for two to three years, and shall report their history in a later communication. It is gratifying to note at this time, however, that the hitherto rather common late effects, known as traumatic neurosis, have been generally avoided. This complex, as I have stated above, is due to the prolonged pressure anemia of the cerebral cortex with its resultant gliosis that follows the plan of watchful expectancy for medullary symptoms recommended by most of our textbooks.

ILLUSTRATIVE CASE REPORTS

CASE 1.—F. de M., a man, aged 33, brought unconscious to Cook County Hospital by the police, Oct. 1, 1921, one-half hour after being struck by a street car, and discharged, October 25, was bleeding from the nose, mouth and left ear. Both eyes were ecchymotic. The pupils were equal, and reacted slowly to light and accommodation. The left clavicle was fractured. Fracture of the skull, hemorrhage and contusion of the brain were suspected. The pulse varied between 60 and 70; the temperature was 98; the respiration, 18. The systolic blood pressure was 150; the diastolic, 70. Spinal puncture yielded bloody fluid in three tubes. The pressure was 20 mm.; the removal of 20 c.c. of fluid resulted in a reduction of the pressure to 10 mm. Roentgen-ray examination revealed linear fracture of the left parietal bone, extending to the base of the skull.

Spinal puncture was performed daily, with estimation of pressure and removal of fluid.

October 2, the patient was unconscious; pulse, 62; blood pressure, 130 systolic and 70 diastolic; spinal fluid pressure, 24 mm. On the removal of 30 c.c. of bloody fluid, the pressure was reduced to 12 mm.

October 3, the patient was still unconscious; blood pressure, 125 systolic and 76 diastolic; spinal fluid pressure, 28 mm. On removal of 30 c.c. of less bloody fluid, the pressure was 14 mm. The pulse was 56; temperature, 101.

October 6, the pulse was 68; temperature, 100; blood pressure, 125 systolic and 75 diastolic; spinal fluid pressure, 18 mm.; 20 c.c. of yellow fluid was removed and the pressure was reduced to 8 mm.

October 12, the pulse was 72. The patient could now be aroused from his stupor. The temperature was 99; spinal fluid pressure, 8 mm.; 10 c.c. of clear fluid was removed and the pressure was reduced to 5 mm.

October 24, the pulse was 72; mentality, clear; spinal fluid pressure, 7 mm.; 5 c.c. of clear fluid was removed.

October 25, the patient was discharged from the hospital, making no complaints.

Lumber puncture a few hours after entrance to the hospital revealed a bloody fluid under marked pressure, establishing positively the diagnosis of hemorrhage and edema of the brain.

Repeated punctures disclosed that the pressure was increasing till the third day, when it began to fall, reaching normal on the twelfth day. This was an unusually severe case with fracture, which terminated in recovery in four weeks.

CASE 2.—W. R., a man, aged 65, struck by an automobile and brought to Cook County Hospital by the police, entered the hospital department, Sept. 3, 1921, and was discharged, October 8—a stay of thirty-five days. On entrance the patient was unconscious; pulse, 100; blood pressure, 150 systolic and 90 diastolic; right pupil contracted; ecchymosis of right eye. The roentgen ray did not reveal fracture. Spinal puncture yielded a clear fluid under 25 mm. pressure; on withdrawal of 10 c.c., the pressure was reduced to 15 mm.

September 4 the pulse was 60; fluid pressure, 22 mm.; on removal of 10 c.c. of bloody fluid, the pressure was 10 mm.

September 7, the patient was more clear mentally; motor aphasia was now present. Dr. Hassin gave an unfavorable prognosis because of the patient's age and the presence of aphasia and chronic nephritis. The pulse was 72; spinal fluid pressure, 12 mm.; on removal of 5 c.c. of bloody fluid, the pressure was reduced to 6 mm.

September 10, the pulse was 100; the patient's mentality was clearing. The spinal fluid pressure was 15 mm.; on withdrawal of 10 c.c. of yellow fluid, the pressure was reduced to 6 mm.

September 18, the patient was able to speak a few words with difficulty. Pressure still was 15 mm. On the withdrawal of 10 c.c. of clear fluid, the pressure was 6 mm.

September 28, speech was a little easier. The pressure was 10 mm.; the fluid was clear; 5 c.c. was removed.

October 7, the patient was in good general condition, able to walk about and to go home. The power of speech was improved.

November 15, the patient was examined at home. Speech was fully restored. Spinal puncture disclosed a pressure of 15 mm.; on removal of 10 c.c. of clear fluid, the pressure

was reduced to 6 m.m. The patient felt good; he went out walking alone; he had no headache.

December 15, there were no complaints.

This old man made a remakable recovery, not only from hemorrhage and edema of laceration, but also from his aphasia. It is to be remarked that the spinal fluid was clear on the first puncture and bloody on the second puncture.

CASE 3.—A. S., aged 19, who entered the hospital in the police ambulance as having skull fracture, March 13, 1922, at 9 p. m., and was discharged, April 9, had been struck by a street car. The patient was disoriented, and complained of headache. There was a scalp laceration over the left parietal region. The nose showed dried blood. The ears were normal. The eyes showed slight divergence. The pupils were equal and reactive. The patellar and abdominal reflexes were absent.

March 14, the patient was drowsy and irritable and vomited. Spinal puncture revealed bloody fluid under a pressure of 30 mm., which was reduced to 15 mm. by withdrawal of 20 c.c. of spinal fluid. The reflexes were now present; pulse, 52; respiration, 15; temperature, 98.

March 15, the patient was stuporous; the pulse, from 48 to 52. There were no focal symptoms. The patient answered questions now. The temperature was between 100 and 101; respiration, 24. Lumbar puncture revealed the fluid still bloody, but less so than the day before. The pressure was 23 mm., reduced to 10 mm. by the removal of 20 c.c. of fluid. The patient was given 150 grains (10 gm.) of sodium chlorid in capsules coated with phenyl salicylate to reduce intracranial pressure.

March 16, the pulse was from 54 to 56; temperature, from 99 to 100; respiration, from 24 to 28. The patient was still drowsy, but less irritable. Puncture yielded 20 c.c. of salmon colored fluid; pressure of 18 mm. was reduced to 10 mm. The sodium chlorid had no marked effect.

March 17, headache was still present. Pressure of 28 mm. was reduced by removal of 25 c.c. of light salmon colored fluid to 8 mm. The pulse was 44 before puncture and 60 afterward. The blood pressure was 130 systolic and 110 diastolic.

March 18, the temperature was 98; pulse, 72; respiration, 20. There was less headache. The patient responded to questions more readily.

March 19, the pulse was 62; temperature, 97; respiration, 20. Headache was moderate. Removal of 20 c.c. of clear fluid reduced the pressure from 14 to 8 mm.

March 21, the pulse was 72; temperature, 97; respiration, 20. Headache was almost gone.

March 22, the pulse was 70. The patient was reading.

March 23, the pulse was 72. There was soreness in the head, but no headache except on sitting up.

March 29, the patient was sitting up in bed. The pulse was 80; blood pressure, 118 systolic and 75 diastolic.

April 5, after spinal puncture, the pressure was 8 mm. The roentgen ray, revealed a linear fracture in the left temporal region.

SUMMARY

This theory of the pathogenesis of intracranial pressure is based on the modern conception of the cerebrospinal fluid and the pathologic lesions seen at operation and at necropsy. The diagnosis is made early by the exact estimation of intracranial pressure with the mercurial manometer. A rational method of treatment based on this theory and applied early, when indicated by an exact diagnosis in more than 300 cases of contusion of the brain, has given satisfactory results both immediate and remote. The immediate results are borne out by a reduction in mortality from 50 to 25 per cent. The remote results are seen in the absence of continued headaches, nervousness, irritability, vertigo and inability to work. Lastly, the treatment advocated leaves no mutilating skull defect, and is without danger.

ABSTRACT OF DISCUSSION

DR. E. J. MCKESSON, Toledo, Ohio: Dr. Jackson has brought us a new thought in handling brain injuries in that he advocates the relief or the prevention of the so-called cardinal signs of these conditions as we have known them today. His reasoning is perfectly logical. I should like to ask him regarding spinal pressure in operations on the skull (not necessarily following injuries), whether he has noticed the brain of some patients with low spinal pressure to be considerably reduced in volume, that is, on opening the skull whether the brain, instead of being close to the skull, is very much receded. In a recent case in which an operation was performed at the request of the family and the patient because of some mental disturbances, prior to the operation the pressure was 6 mm. in the sitting posture; when the skull was opened, the brain was much receded from the skull, leaving a very large space.

DR. F. H. MECHAN, Avon Lake, Ohio: We should all go away with the lesson that in most skull injuries there is not only an element of increased spinal pressure but also a medullary edema. I regret that Dr. Jackson and his associate, Dr. Beck, did not perform some further experiments on the animals that had been submitted to brain injuries or in which brain edemas had been produced. A Scandinavian investigator, von Kuhlman, found that in acute alcoholism, as well as in saturation from anesthetics, in the presence of edema of the brain, the choroid plexus function could be suppressed, and, with the tremendous increase of the spinal pressure due to the edema of the brain, the anesthetic no longer circulated but was precipitated as a raw chemical in the spinal fluid; that is, chloroform and ether, as such, could be recovered from the spinal fluid when used as anesthetics in patients with brain edema. To show the relation of reduction of the spinal pressure and the handling of brain edemas in brain surgery, I wish to refer to a paper, recently read at a meeting of the Pacific Coast Anesthetists at Yosemite, in which it was shown that in those cases which were inoperable under blood pressure rules and in which there was a dangerous degree of increased spinal pressure as well as edema, the use of the rectal drip, from the time the patient was placed on the table and continuously throughout the entire course of the operation, reduced the usual average mortality rate of more than 68 per cent. in these extrahazardous risks to less than 21 per cent. When we can secure such a tremendous reduction in the death rate simply by alkalization and a reduction of the edema and a consequent reduction in the spinal pressure, it is certainly a technic which all operators in brain surgery, and particularly anesthesists, would do well to follow out. We were shown yesterday by Dr. Martin H. Fischer that it required only a 5 per cent. increase in edema of the brain to jeopardize existence. One can readily see, therefore, why a reduction or a withdrawal of 10 or more cubic centimeters of spinal fluid in order to reduce the pressure of normal, or alkalization, has a profound influence in reducing the mortality of brain and skull operations in bad risk patients.

DR. HARRY JACKSON, Chicago: It is most interesting to hear what Dr. McMechan has said regarding Fischer's theories in reducing edemas. I have put into practice the ideas of some of the men in the East to reduce edemas by using concentrated solution of sodium chlorid intravenously and by intestinal absorption. Fluid will be withdrawn from all tissues of the body, including the brain. If we can do the same thing by means of alkalis which are not so dangerous as sodium chlorid, that may be a better method and worth trying. However, these methods do not remove blood from the cranial cavity, as does the method of simple puncture, which is a factor that must be considered.

Roentgenologic Indications of Malignancy.—There are but two varieties of ulcerous gastric lesions which evince any noteworthy roentgenologic indications of malignancy. One is the ulcerating cancer with the meniscus-like crater. The other is the niche type of ulcer with an unusually large crater.—R. D. Carman.

COUGH

BRONCHOSCOPIC OBSERVATIONS ON THE COUGH REFLEX *

CHEVALIER JACKSON, M.D.
PHILADELPHIA

Cough may be either a voluntary or an involuntary act; perhaps most often it is an involuntary act reinforced by volition. Semicough,[1] commonly called "clearing the throat" and expressed in lay literature as "ahem," is always voluntary, though nerve-cell habit may make it an almost subconscious act. It is only the involuntary cough of purely reflex character that will be considered here.

The following brief and clear statement of the physiologic mechanism of cough by my colleague Prof. Albert P. Brubaker is authoritative: "The cause of the cough is an irritation in the area of distribution of the glossopharyngeal, the trigeminal and perhaps other sensory nerves as well. In the unconditioned or purely reflex cough, the local irritation develops nerve impulses which are transmitted by the vagus from the air passages."

My colleague Dr. F. J. Kalteyer, in a personal communication, calls my attention to the fact that MacKenzie[2] contends that "the cough in affections of the lung arises only when the secretion has been carried by the contractions of the bronchial muscles, and by the cilia of the respiratory tract, so far upward as to reach the sensitive region about the larynx." My bronchoscopic observations show the error of MacKenzie's opinion. As to the internist's point of view, Kalteyer states that:

> There is abundant clinical evidence in support of the view that the pulmonary parenchyma is devoid of terminal afferent nerves essential to this reflex arc.

The bronchoscopic observations that I have made corroborate this.

Both physiologists and clinicians seem to have overlooked the fact that a condition of tolerance is quickly established that lessens and often entirely obliterates temporarily the reflex excitability of the bechic excitation areas.

Fig. 1.—A case of total absence of the cough reflex from the presence of a safety pin in the trachea of a girl, aged 6 years. The foreign body was in situ four days. The only symptom was dysphagia. (This roentgenogram and those reproduced in Figs. 3, 4, 6 and 7 were made by Dr. Willis F. Manges.

COUGH IN DISEASE OF THE TRACHEOBRONCHIAL TREE

In certain cases, usually in children, the cough reflex may be entirely absent. I have reported[3] cases in which this occurred, notably in toxic conditions, particularly influenza. The bronchoscope was passed without any anesthesia, general or local, yet its presence excited no cough. In some of the cases, the absence of the cough reflex led to the patient drowning in his own secretions, a condition that, when temporary, can readily be tided over by bronchoscopic aspiration. It is a curious fact noted in a number of cases that in adults with an acute influenzal tracheitis with much subjective pain, distress and strangling cough, the trachea does not seem hypersensitive to the contact of the tube, and both adults and children seemed to be relieved by the aspiration of secretions, and the spraying in of an oily preparation of monochlophenol of a strength of 4 drops to the ounce, though I would not go so far as to urge bronchoscopy except in cases in which secretions need to be aspirated. In cases of lobar pneumonia, bronchopneumonia, tuberculosis, acute and chronic bronchitis, abscess, bronchiectasis and benign and malignant growths, the cough reflex from tubal contact seems diminished rather than increased. These observations would seem to indicate that there is an essential physiologic difference between contact cough and inflammatory reflex cough.

Cough During Bronchoscopy Without Anesthesia. — One of the most interesting observations in bronchoscopic work deep down in the lung without sedatives or anesthesia, general or local, is the tolerance established after a few minutes of mucosal contact of the tube. When the bronchoscope is first introduced into, say, the left bronchus, cough is excited. This subsides in a few minutes, and the left bronchus remains tolerant as long as the bronchoscope remains in that bronchus. After tolerance is established, movement of the bronchoscope does not excite cough, unless the tube-mouth is brought into contact with new areas of mucosa by deeper insertion or its equivalent in rotating the bronchoscope so that the long end of the slanted lip reaches a mucosal area previously out of contact. If now we withdraw the bronchoscope and work for five minutes or longer elsewhere, say, in the right bronchus, on our return to the left bronchus with the tube-mouth,

* Read before the Section on Laryngology, Otology and Rhinology at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.

1. Jackson, Chevalier: Moss-Agate Tracheal Sputum, Pennsylvania M. J. **25**: 613 (June) 1922.

2. MacKenzie, James: Symptoms and Their Interpretation, Ed. 4, London, Shaw and Son, pp. 212, 309.

3. Jackson, Chevalier: Influenzal Tracheitis, Laryngoscope **22**: 88 (Feb.) 1912; Peroral Endoscopy and Laryngeal Surgery, St. Louis, Laryngoscope Company, 1915, pp. 482 et seq.

we find that the previously established tolerance has vanished, and that as much cough is excited on mucosal contact of the tube as when the left bronchus was entered for the first time.

These observations have a very important clinical bearing as they explain curious phenomena frequently noted clinically. One of these phenomena, abundantly proved by frequent observation, is that a fixed foreign body causes very little cough as compared to a movable foreign body. The logical inference is that the fixed foreign body establishes a tolerance by remaining in contact with the same mucosal surface, whereas the movable foreign body is frequently coming in contact with areas untouched, or not recently touched. Another clinical fact explained by the bronchoscopic observation is the now well-known symptomless interval, first pointed out by me, that nearly always ensues after the initial choking and coughing when a foreign body is first aspirated. This symptomless interval in nonobstructive foreign bodies not derived from the vegetable kingdom may last for days, even weeks, in cases of metallic bodies; and has been the chief factor in the diagnostic mistake of excluding foreign body on the inference that a large sharp foreign body could not be present in the bronchi without exciting cough.

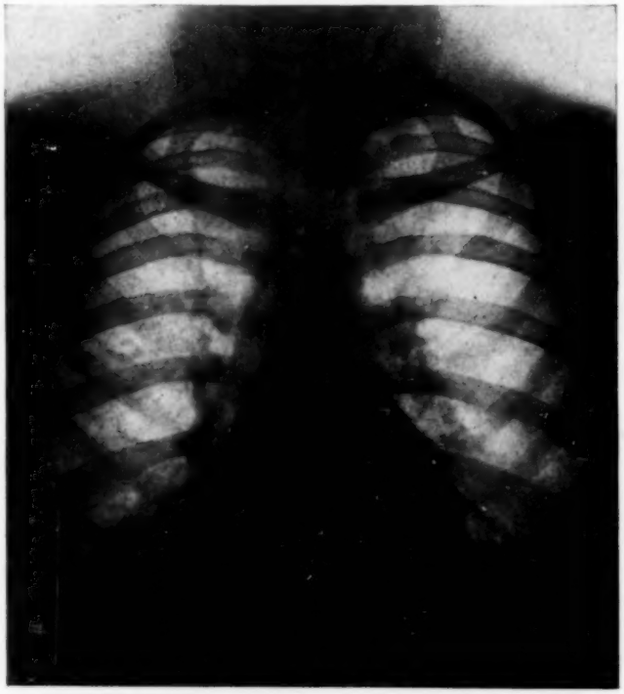

Fig. 2.—A case of total absence of the cough reflex from the presence, during a period of two months, of a safety pin in the lung of a woman, aged 18. The inference is that afferent bechic impulses are not generated in this peripheral portion of the lung after tolerance is established. Productive cough started two months after aspiration of the pin. (Roentgenogram by Dr. James F. Kelly.)

Cough During Bronchoscopy Under Local Anesthesia. — In children, bronchoscopy is done in the Bronchoscopic Clinic without anesthesia, general or local; but in adults, local anesthesia is used. In the latter, it has been noted, hundreds of times, that cocain anesthesia of the larynx permits the introduction of the bronchoscope through the glottis without exciting cough; but just as soon as the orifice of either main bronchus is reached, cough, usually severe, is excited, unless a local application has been made to the region of the bifurcation. As the larynx has been eliminated as the source of afferent impulses in the bechic cycle, it is clear that MacKenzie's statement that "the respiratory tract below the larynx and the lung tissue seem to be incapable of originating the stimulus" (i. e., for cough production) is an error.

When the cough reflex has been temporarily abolished in the larynx and bronchi by cocain, for the introduction of a bronchoscope, the reflex does not reappear so long as the bronchoscope remains in contact with the same surfaces, indicating that the abolition by the drug has been followed by the abolition by tolerance. If, however, the bronchoscope is introduced into a previously uninvaded and unanesthetized bronchus, cough is excited. That this movement is not due to the sliding movement of that part of the bronchoscope that lies in the larynx is indicated by the fact that so long as the vertical excursion of the distal end of the bronchoscope does not exceed the extent of the cocainized area, no cough is excited. Another observation that eliminates the movement of the bronchoscope in the larynx as the source of the tussive excitation is that a rotatory movement of the bronchoscope, which necessarily is associated with a sliding of the bronchoscopic surface over the locally anesthetized laryngeal mucosa, does not excite cough if the tube-mouth is not moved vertically so as to enter a new or unanesthetized area of bronchial mucosa.

COUGH IN CASES OF FOREIGN BODY IN THE AIR AND FOOD PASSAGES

Foreign Bodies in the Bronchi.—So far as I am aware, there is in the literature no distinction between the cough produced by the foreign body and that produced by the secondary pathology set up by the foreign body. That such separation is essential is evident when it is recalled that under practically all conditions of normally active reflexes, the presence of secretions in excess of normal mucosal moisture will excite the cough reflex for expectorative purposes. This is the normal activity of the cough reflex, which is "the watchdog of the lungs," not only in the sense of repelling intruders attempting to enter, but also in expelling dangerous elements generated within the lungs.[4] Since the latter phase of the question is quite similar to the expectorative cough in all secretion-producing diseases of the tracheobronchial tree and alveolar extensions, separate consideration is not necessary here, except mention of the previously noted [5] great variation in the extent of the pathologic condition and pathologic secretions produced by foreign bodies of different character, more especially as to two factors, namely: (1) the nature of the foreign body, and (2) the amount of obstruction to drainage and aeration that results from its size, shape, position and location. Apart from the matter of secretion, the mucosal inflammation, it is logical to assume, excites the cough reflex in a manner parallel to that of the nasal sternutatory reflex, in which an afferent impulse is excited by the irritation of the nerve endings in the nasal mucosa by either inflammatory processes or the noninflammatory

4. Jackson, Chevalier: Postulates on the Cough Reflex, Therap. Gaz. **44**: 609 (Sept. 15) 1920.

5. Jackson, Chevalier: Pathology of Foreign Bodies in the Air and Food Passages, Mütter Lecture, Surg., Gynec. & Obst. **28**: 201 (March) 1918.

mechanical or chemical irritation of those same endings by contact with any substance, foreign or native. This is paralleled in the pulmonary tussive reflex by an afferent impulse arising either from the irritation of the nerve endings by a mucosal inflammatory process or by mechanical or chemical contact of some substance, foreign or native, with the mucosa. It is the afferent impulse thus excited, plus the resulting efferent impulse to the respiratory musculature, that completes the cycle that makes the cough reflex the watchdog of the lungs.

Since foreign bodies were almost always immediately removed when found, there has been no opportunity for making in the same case consecutive studies, at intervals, of the reaction to the presence of foreign bodies in the trachea and bronchi. The following observations, therefore, are based on observations in different cases presenting different lengths of sojourn. The abundant material at the Bronchoscopic Clinic presented the opportunity for observation in cases closely parallel as to nature of the foreign body, site of lodgment, etc.

Cough Caused by Mechanical Contact of a Foreign Body.—The histories of hundreds of cases, with foreign bodies of widely different character, indicate clearly the following points:

1. The first contact of a foreign body with the mucosa of the laryngotracheobronchial airway sets up a violent coughing attack.

2. This cough quickly subsides, in cases of foreign bodies not derived from the vegetable kingdom, if the foreign body remains fixed in one place.

3. If the foreign body is constantly being moved by the respiratory or bechic blasts so as to touch previously untouched mucosal surfaces violent paroysms of cough are excited.

Fig. 3.—A case of total absence of the cough reflex during a three-day sojourn of a pin in the lung of a girl, aged 15 years. Tolerance was established within a few minutes after the subsidence of the initial laryngeal protective reflex. Thereafter there was no cough, no pain, no expectoration or other symptom during the entire sojourn of one month.

The foregoing observations are interesting in connection with the fact noted elsewhere in this article in regard to the quickly established tolerance of the bronchoscope so long as it remains in one location, and the quickly lost tolerance after the bronchoscope has been removed.

Cough Due to the Inflammatory Reaction Following the Lodgment of Foreign Body.—In cases of nonobstructive foreign bodies, after an interval ranging from a few hours to a few days, there is, in some cases, a slight cough, and in these cases there was noted at bronchoscopy a moderate degree of mucosal inflammation in the immediate neighborhood of the foreign body. If the foreign body remains unobstructive, and especially if it is of a metallic nature, little or no cough appears for an interval of many weeks, even months in some instances, notably that of a dental root canal reamer. In this instance, the metallic instrument was in the left upper lobe bronchus for three months.

A study of the roentgenograms reproduced in Figures 2, 3 and 4, together with their legends, will show that the extreme periphery of the tracheobronchial tree is not a source of production of afferent tussive stimuli until secondary inflammatory changes have resulted in pus formation; whereas the main bronchial trunks are sources of bechic excitation. Except for this, foreign body lodgment gives no certain indication of the existence of constant definite excitation areas; nor of definite areas incapable of excitation of the tussive reflex. The illustrative plates are selected from many similar ones.

Cough Excited by the Presence of Secretions.—This is one phase of the subject on which it has been exceedingly difficult to obtain conclusive data with the bronchoscope. No one doubts that the presence of secretion in the bronchi excites cough for expectorative riddance. The inference has been that the cilia waft up the secretions to a certain point at which the bechic reflex is excited to complete the expulsion; but this is not proved by bronchoscopically visible evidence. When a patient whose lung contains pus coughs, the pus is seen to come up from the smallest visible as well as the largest bronchial orifices. This has the appearance of having been forced up by the squeezing of the lung during the expulsive compression. When this secretion is removed, its place is taken by more secretion brought up from below. This is repeated until the peripheral portion of the lung is emptied. This is the method the bronchoscopist uses to empty the lung in that numerous class of cases in which the pus or secretions are scattered throughout the passages in a section of lung. It is exceedingly rare that there is a single cavity or several cavities that can be emptied, as is the case with abscesses in other regions. Usually, the pus is contained in a large number of bronchi or fistulous remnants of bronchi, and these are more or less completely filled with exuberant granulations.

Two points are very clear: (1) in all cases of foreign bodies, whatever their location, when associated with the production of pus, cough was a prominent symptom, and (2) in most instances it did not differ materially from the cough present in any other condition associated with secretion of a similar amount and character.

Cough in Cases of Arachidic Bronchitis.—The more than seventy cases in which peanut kernels, grains of

maize, watermelon seeds and other vegetable substances were the causal factors indicate clearly that such substances, even when not movable, excite severe and frequent coughing attacks. The symptomless interval is very short in cases of very young children and may be absent altogether. The prompt outpouring of thick tenacious mucopurulent or purulent secretion is so prompt that cough for expectoration supervenes almost at once.

Cough in Cases of Foreign Body in the Larynx.—To anyone who has experienced, as probably everyone has, the choking, strangling cough that follows the entrance of a drop of water or a crumb of bread into the larynx, it is an amazing thing to note the tolerance of the organ to the prolonged sojourn of foreign bodies. For instance in one case, a cockle bur was lodged for twenty-four hours in the larynx of a man, aged 25. At the time of the accident it had caused a degree of

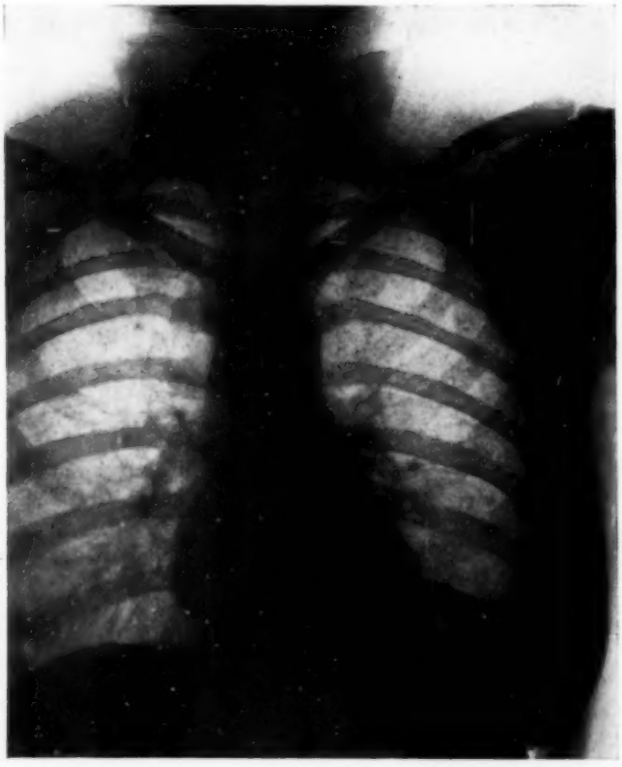

Fig. 4.—Very active cough was present from a safety pin in the left upper lobe bronchus of this patient, a woman aged 20. Comparing this case with those illustrated in Figs. 1, 2 and 3, the inference is that the neighborhood of the orifice of the upper lobe bronchus is a bechic excitation area. Tolerance was, however, becoming established even in this case.

choking, gagging, coughing and vomiting, which subsided in fifteen minutes, after which there was no cough. There was no pain, but a desire to "clear the throat" to restore the voice, the patient being entirely aphonic. The bur was found, sticking into the mucosa at the anterior commissure (Fig. 5), from which position it was removed by direct laryngoscopy. When one considers the sharp needle-like, hooklike thorny spines on a cockle bur and that these spines were buried in the traumatized mucosa, the absence of cough after the first fifteen minutes can be explained only on two hypotheses: (*a*) that a condition of tolerance was established after fifteen minutes of contact; or (*b*) that the bur was first in the posterior region of the larynx and that the anterior portion of the larynx was incapable of exciting afferent bechic stimuli. The decision as to which of these was responsible cannot be based on the clinical evidence in this case, but the following case of a safety pin in the larynx indicates that tolerance was the factor. This is further indicated by a case in which a cockle bur was located in the central zone of the larynx for three days without cough after the paroxysm that accompanied the initial choking and gagging. In this connection, the cases of sandspurs reported by Dr. H. M. Taylor [6] are interesting.

Fig. 5.—Drawing illustrating the total absence of cough reflex excitation in the anterior portion of the larynx of a man, aged 25. The cockle bur was in situ for twenty-four hours without any cough after the first fifteen minutes following its aspiration. Aphonia was present from mechanical obstruction to cordal approximation.

In another case, a child, aged 10 years, aspirated a safety pin into the larynx. There were coughing and choking, but in the subsequent three weeks there was no cough, though the child was hoarse. The pin was found in the sagittal plane, the keeper being pressed by the spring tightly into the posterior commissure. It was readily removed by direct laryngoscopy. This case, I think, shows that tolerance is established by continuous sojourn of a foreign body in the larynx. The keeper in the posterior commissure which is supposed to be productive of bechic excitation indicates that the region invaded by the bur in the previously cited case was not accountable for the absence of cough. This case was closely paralleled by the five other cases of safety pin in the larynx in the Bronchoscopic Clinic, and by the cases of Dr. Henry B. Orton.[7] The establishment of tolerance of the larynx to the presence of foreign bodies was shown by O'Dwyer in the development of intubation, and is now a matter of common observation in intubated cases, as it is also in bronchoscopy without anesthesia.

Cough Following Lodgment of Foreign Bodies in the Esophagus.—Of the nearly 500 cases of foreign body in the esophagus seen in the Bronchoscopic Clinic, cough was never noted in any case of nonobstructive foreign body in the esophagus. On the other hand, cough was a very frequent, in fact quite a constant symptom, in cases of obstructive foreign body in the esophagus. The cough in these cases is due to the secondary laryngotracheobronchitis from overflow into the larynx of secretions and food that cannot quickly get down the esophagus. Such a case is illustrated in Figure 6. No one realizes the amount of saliva that normally drains away into the stomach by subconscious swallowing. This alone, when overflowing into the larynx, can set up not only cough but bronchopneumonia. The same thing can happen from ulceration of a foreign body through the party wall into the trachea with consequent intrapulmonary aspiration of the leakage. Cough of purely reflex origin from a foreign body in the esophagus must be exceedingly rare as it was suspected in only a few instances in the more than 500 cases of esophageal foreign body in the

6. Taylor, H. M.: Endoscopic Removal of Sandspurs from Larynx and Tracheobronchial Tree, J. A. M. A. **77**: 685 (Aug. 27) 1921.
7. Orton, H. B.: Laryngoscope **31**: 233 (April) 1921.

Bronchoscopic Clinic, and, in all of these, other origin of the cough could not be excluded.

CONCLUSIONS

1. Etiologically, cough as encountered by the bronchoscopist may be divided into contact cough, inflammatory cough and productive cough.

2. The contact of a bronchoscope in any of the larger bronchi excites cough if no anesthetic, general or local, is used. This excitability is lost, and a condition of tolerance is established, if the tube remains in situ a few minutes. This condition of tolerance disappears in a few minutes after the tube is withdrawn. If a few minutes later, the previously tolerant bronchus is reentered, cough is as readily excited as when it was entered in the first instance.

3. The first contact of a foreign body produces a paroxysm of coughing, which quickly subsides if the foreign body remains fixed in one location and position.

4. This condition of tolerance is established after a sojourn of the foreign substance for a time, varying from a few minutes to many hours, depending on many factors, chiefly the nature of the foreign body and its location. After this condition of tolerance is established, the cough may be totally absent or only occasional and it is not paroxysmal. It is usually, for a time, dry and unproductive, except in cases of vegetable substances. This is the explanation of the clinically deceptive "symptomless interval." After pus forms cough appears.

5. In cases of vegetable substances (arachidic bronchitis) the cough is early, loose, productive, and is often associated with dyspnea, cyanosis and strangling, because of the difficulty in expulsion of the thick tenacious mucus.

6. Shifting of the foreign body to a new location, or the shifting of the position of the foreign body in such a manner as to bring any part of it into contact with a previously untouched part of the mucosa, practically always excites cough.

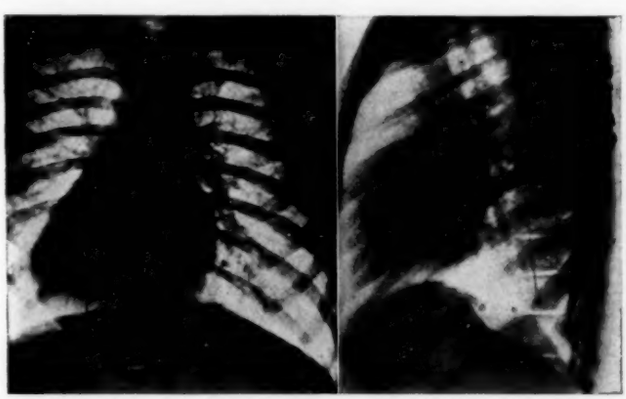

Fig. 6.—Illustrating absence of cough from a shawl-pin deep in the left lower lobe of a girl, aged 10 years. The apparently warranted inference is that the periphery of the lung is not a source of tussive afferent impulses. This seems curious in view of the fact, observed in this and other cases by Prof. Thomas McCrae, that unilateral limitation of expansion without bronchial obstruction indicates the presence of nontussive afferent impulses.

7. Violent paroxysms of coughing in cases of foreign body in the lung usually mean that the foreign body is not fixed, but is being knocked about so as to come in contact frequently with new areas of mucosa. This sign is diagnostic of movable foreign body.

8. There is no bronchoscopic evidence going to show that the mucosa in some locations in the tracheobronchial tree is so much more sensitive than are others as to be worthy of being called bechic excitation areas.

The contact of the bronchoscope shows that all areas in the trachea and larger bronchi are subject to individual variations and exceptions. The trachea from a

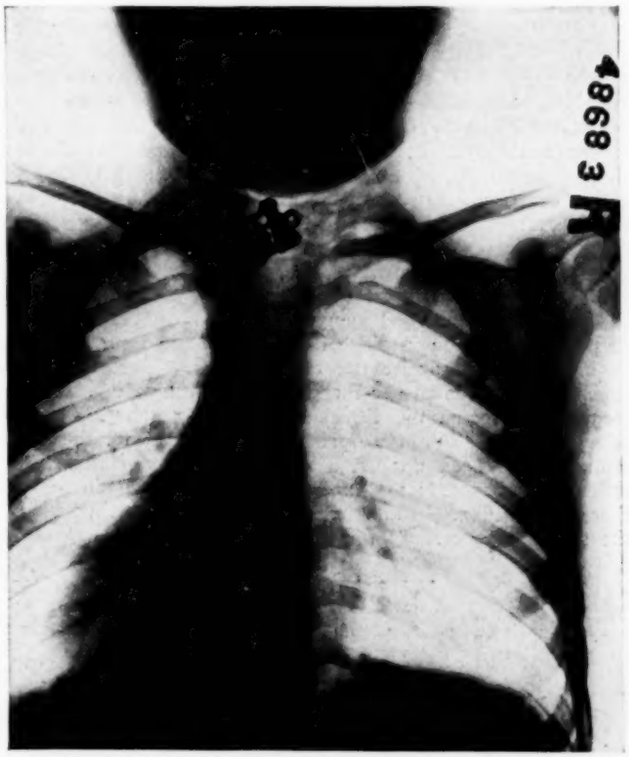

Fig. 7.—Cough was active in this case of foreign body in the esophagus of a boy, aged 4 years; but it was due to overflow of secretions into the larynx and tracheobronchial tree caused by the obstruction of the esophageal lumen. No case of proven purely reflex esophageal cough has been noted in the Bronchoscopic Clinic.

point about 1 cm. below the larynx to another point about 1 cm. above the bifurcation seems slightly less provocative of cough from contact with the bronchoscopic tube; but tubal contact here will cause moderate cough until tolerance is established. No difference in reaction to contact stimuli has been noted between the anterior and posterior wall.

9. There is no bronchoscopic evidence of the existence of areas in the bronchoscopically enterable portions of the tracheobronchial tree that normally yield no bechic reflex on first contact of a foreign body; but tolerance is quickly established in any and all areas, and, in the case of certain diseased states of the tracheobronchial tree, the cough reflex may be totally abolished.

10. The finer subdivisions of the tracheobronchial tree, which together with the alveoli are not enterable with a bronchoscope, but are enterable with a slender instrument, show decidedly less cough production from instrumental contact, and in most cases all peripheral areas show no cough reflex unless the proximity of the visceral pleura is reached and pushed on. This pleural reflex is very rarely observed, and its existence is somewhat doubtful.

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ABSTRACT OF DISCUSSION

DR. SAMUEL IGLAUER, Cincinnati: Foreign bodies in the esophagus do not cause cough. In this instance clinical experience agrees with *a priori* reasoning. One would expect a foreign body in the esophagus to cause gagging and vomiting, but not cough. One of the discomforts of the patient during esophagoscopy may be due to some of the saliva trickling into the larynx where it may produce irritation and cause cough. Dr. Jackson has distinguished between contact cough, inflammatory cough and productive cough, illustrating the point that after a time contact will not cause cough. We all know that violent coughing occurs as soon as the cannula is introduced, but in a few minutes the cough subsides. But if the next day one should remove and then put the cannula back, coughing is set up again. I can see no particular difference between inflammatory cough and productive cough. Inflammatory cough is due to irritation of the terminal filaments of the nerves in the mucosa. When that inflammation leads to secretion, the secretion becomes a foreign body which by ciliary action is brought into contact with new parts of the mucosa, and a combination of inflammatory and contact cough is seen. Dr. Jackson used the word "tolerance." I suppose he means that after a foreign body has been in place for a certain time mere contact is insufficient to excite the cough reflex. This tolerance, then, must be due to the fact that the stimulus is not sufficient to overcome the threshold. The physiologists speak of a minimum stimulus to produce a reflex. After the same stimulus has been applied a certain number of times, the reflex is exhausted; and unless the stimulus is increased, there is no reflex. I think that tolerance means falling below the threshold necessary for stimulation.

THE CAPILLARIES OF THE EXTREMITIES IN ACROCYANOSIS

BLOOD PRESSURE AND MORPHOLOGY *

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NEW YORK

The pathologic physiology underlying the condition known as acrocyanosis is not thoroughly understood. In recent years considerable attention has been directed to the part that disorders of the capillaries and venules may play in causing this symptom.

In 1918, Grace Briscoe [1] published observations on the venous and capillary pressures of soldiers, at the Hampstead Military Heart Hospital, who were suffering from "irritable heart." It is well known that such patients often exhibit acrocyanosis to a striking degree. Her method of determining the capillary pressure is similar to that of von Basch. By this method a capsule is affixed to the skin, and air is forced into it until the skin becomes blanched and a further rise of pressure produces no more whitening. The manometric reading at this point is taken as the capillary blood pressure. Using this technic, Briscoe found the capillary blood pressure distinctly elevated in these patients when the hands were blue. When the hands were normal in appearance, the capillary pressure approximated that of the normal controls. Her figures are: Capillary pressure in millimeters of mercury for normal controls, 17.3; for patients when the hands were normal, 19.0, and when the hands were blue, 27.1. The venous pressure in all three groups was about the same.

From these observations, Briscoe concluded that there must be a constriction of the venules sufficient to cause a high capillary pressure without alteration of the venous pressure. She further considered the possibility of a simple dilatation of the capillaries, but believed it hardly probable.

In 1920, Danzer and Hooker [2] discussed the wide errors inherent in the method of von Basch, as well as in the other procedures that have been employed in the measurement of the capillary pressure, and described a microcapillary tonometer, by means of which the capillary blood pressure may be estimated with considerable exactitude and with the avoidance of the errors of the older methods. I have discussed the possible inaccuracies of their method elsewhere.[3] While engaged in a general study of the capillary blood pressure by means of Danzer and Hooker's instrument, I have had the opportunity to examine twelve patients who exhibited acrocyanosis from the mildest to the more severe degrees. The technic of the original authors was carefully followed, except that the finger of the patient was not scrubbed, for fear of introducing a complicating factor. The hand was held at the level of the heart during the examination. The results of ten examinations are recorded in the accompanying table.

RESULTS OF EXAMINATION IN TEN CASES OF ACROCYANOSIS

No.	Sex*	Range of Capillary Pressure, Mm. Hg	No. of Readings	Appearance of Capillaries	Blood Pressure: Systolic	Blood Pressure: Diastolic	Appearance of Hands
1	♂	2 to 3	5	Long; large subpapillary plexus; slow streaming	115	60	Cold, pale, cyanotic
2	♂	7 to 13	13	Very thick, especially at venous end; many bizarre and convoluted with anastomoses; many rows; slow streaming	220	130	Cold, cyanotic, moist
3	♂	5 to 15 24 in two capillaries	14	Thick and convoluted; many large, slow streaming	105	70	Dusky red; slow return of color after momentary pressure
4	♂	3 to 5	20	Numerous, thick and blue, especially the venous loop; many tortuous and bizarre; slow streaming; much stasis	110	80	Cold, moderate cyanosis
5	♀	12 to 15	3	Thick and convoluted	...	...	Cold, moist, red
6	♂	13 to 21	8	Long, somewhat looped; several rows	110	75	Cold, moist, red
7	♂	10 to 13	10	Numerous, not thick; few tortuous; some anastomoses; slow streaming	120	70	Warm; slight cyanosis
8	♂	5 to 13	10	Long, large, thick, especially at venous end; somewhat tortuous; many rows; slow streaming	105	70	Warm, dry; slight cyanosis
9	♂	6 to 10	19	Long, large, thick, especially at venous end; somewhat tortuous; many rows; slow streaming	110	80	Cold, dusky red, moist
10	♀	3 to 7	8	Numerous; many rows; many convoluted and bizarre	125	90	Cold, pale; not cyanotic

* In this column, ♂ denotes male, and ♀ female.

It is evident that in every case the capillary blood pressure is low. The normal capillary pressure, as

* From the Medical Division of the Montefiore Hospital for Chronic Diseases.

1. Briscoe, Grace: Observations on Venous and Capillary Pressures with Special Reference to the Raynaud Phenomena, Heart **7**: 35, 1918-1920.

2. Danzer, C. S., and Hooker, D. R.: Determination of the Capillary Blood Pressure in Man with the Microcapillary Tonometer, Am. J. Physiol. **52**: 136 (May) 1920.

3. Boas, E. P., and Frant, Samuel: The Capillary Blood Pressure in Arterial Hypertension, Arch. Int. Med. **30**: 40 (July) 1922.

determined by this method, varies from 20 to 30 mm. of mercury. Another striking feature is the lack of variability of the capillary pressure. In patients with normal or high capillary pressure, the readings made on different capillaries usually show a variation of about 20 mm. of mercury. In this series the difference between high and low readings never exceeds 10 mm., and in most instances is much smaller.

A further study of some of the individual cases is instructive. The capillary blood pressure varied with the appearance of the hands. Thus, in Case 1, twenty-one readings taken on different capillaries, Aug. 18 and 25 and Sept. 13, 1921, when the hands were normal in appearance, ranged between 13.5 and 26 mm. of mercury. September 8 and October 5, the hands were very cold, pale and cyanotic. The capillary pressure in ten readings registered 2 or 3 mm. of mercury, and in one capillary only was a reading of 17 mm. obtained. The cold hand was then immersed in very hot water and became bright red in color. The capillary pressure, determined immediately, was from 19 to 20 mm. As the hands slowly cooled and again became pale and blue, the readings dropped first to 13 and then to 8.5 mm. It was striking, too, to observe the change in the blood flow in the capillaries. When the hands were cold and blue, the streaming was very sluggish and irregular; but after the hot water bath it became very rapid, and the capillaries became full. Similar observations were made in Cases 8 and 10. In Case 8, after the hand was warmed, the pressure rose from a range of from 5 to 13 mm. of mercury to a range of from 20 to 27. In Case 10, the pressure before warming was from 3 to 7 mm., and after warming from 7 to 13 mm. In Case 2, thirteen readings, when the hand was

Fig. 1.—Normal appearance of capillaries.

cyanotic, ranged between 7 and 13 mm. During the examination the hand became warm, the capillary flow became accelerated and the pressure rose to between 17 and 23 mm.

It is evident from these observations that when the hands are cold and cyanotic, the capillary blood pressure is low and the flow sluggish. This cannot be due to a constriction of the venules, but must depend on a constriction of the arterioles or a marked dilatation of the capillaries. It is significant, too, that the capillaries become fuller when the hands are warm. If the venules were constricted, the capillaries would be engorged during the period of cyanosis.

A number of observations on the capillary blood flow and on the appearance of the capillaries in acrocyanosis

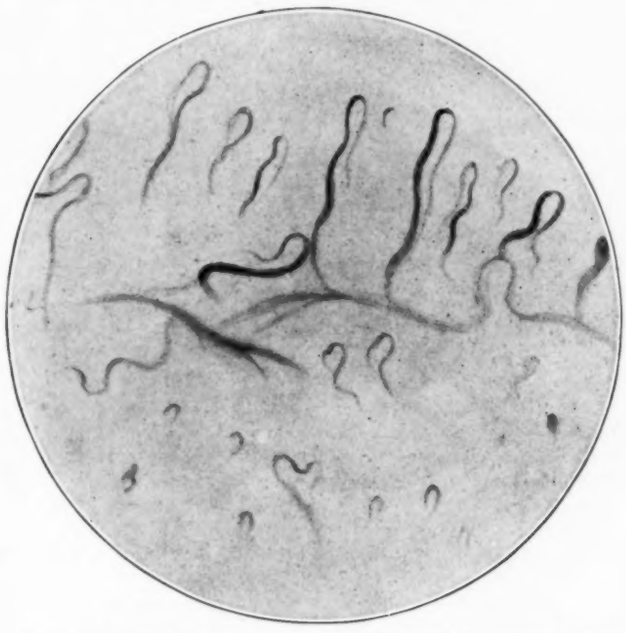

Fig. 2.—Capillaries of normal person with slight vasomotor disturbances of the hands.

have been published. Weiss [4] noted that in patients of an asthenic build, who often exhibit acrocyanosis, the capillaries are more tortuous than normal, particularly in the venous portion, and that the blood stream is slow and may even at times be completely arrested. In the vasoneuroses he saw contractions of the arterial limb of the capillaries in ischemia, and a dilatation of the venous limb when the hands became blue. The appearance of the capillaries, as well as the speed of the blood stream, may vary from moment to moment. Warming the hand accelerates the blood flow in the capillaries.

Mertz [5] found long and tortuous capillaries in children with vasomotor instability. Parrisius [6] observed a movement, which he likened to peristalsis, in the venous arm of the capillaries in a patient with local asphyxia of the feet. This caused an interruption in the continuity of the blood column. He also noted changes in the form of the capillaries in the vasoneuroses. In a case of Raynaud's disease, Weiss saw very wide capillary loops, which exhibited variations in caliber. In a similar case, Pribram and Henius [7] observed a capillary spasm associated with ischemia. Halpert [8] described in detail the capillary changes in a patient with a typical Raynaud's syndrome. She found increased tortuosity of the capillaries, as well as groups of capillaries from three to five times larger than normal. The blood flow was slow. During an attack the

4. Weiss, E., and Holland, M.: Zur Morphologie und Topographie der Hautkapillaren, Ztschr. f. exper. Path. u. Therap. **22**: 108, 1921.
5. Mertz, A.: Kapillarbeobachtungen an Säuglingen, Deutsch. med. Wchnschr. **46**: 480, 1920.
6. Parrisius, W.: Zur Frage der Contractilität der menschlichen Hautkapillaren, Arch. f. d. ges. Physiol. (Pflüger's) **191**: 217, 1921.
7. Pribram and Henius: Bemerkungen zum Kapillarbild bei Raynaudscher Krankheit, Berlin klin. Wchnschr. **57**: 67, 1920.
8. Halpert, A.: Ueber Mikrokapillar beobachtungen bei einem Fall von Raynaudscher Krankheit, Ztschr. f. ges. exper. Med. **11**: 125, 1920.

giant capillaries became fuller, especially in their venous portion and exhibited changes in contour, such as projections and strictures. The blood appeared to be pushed through the vessel by a peristaltic-like wave. In a severe attack the blood became completely stagnant and blue. These observations correspond strikingly to the explanation originally offered by Raynaud.[9]

Fig. 3.—Appearance of capillaries in case of acrocyanosis.

I myself have not observed evidences of contractility of the capillaries in patients with vasomotor disturbances of the hands, but I have not had the opportunity of studying a case with a typical Raynaud's syndrome. However, changes in the form of the capillaries are very striking, as is apparent from the table and from the accompanying illustrations. It is difficult to describe the normal appearance of the capillaries at the base of the finger nail, because of their great variability in structure. Figure 1 represents perhaps the usual picture in healthy persons. Here are seen one or two rows of simple loops near the cuticle, and below them many rows of shorter, more comma-shaped vessels. In patients with chronic vasomotor disturbances of the extremities, the capillaries are usually longer and thicker than normal, particularly in their venous portion, and not infrequently exhibit many convolutions and quite a bizarre arrangement. The rate of the blood flow varies in different vessels, and usually is slow. The streaming may be completely arrested in groups of capillaries.

Some experiments of Lapinsky [10] suggest a possible cause for this alteration in structure. He studied the capillary circulation in the web of a frog's foot after the corresponding sciatic nerve had been severed. For a short period after the nerve had been cut, the blood flow was slow and the vessels empty. In a few days the capillaries became dilated, and the blood stream became rapid. Later the capillaries became wide and tortuous, and the blood flow again became slow. Lapinsky attributed the change in the form of the capillaries to a loss of elasticity and contractility, which resulted in a widening and a lengthening of the vessel. The convolutions are thus dependent on an increase in length of the capillary, just as the tortuosity of one of the peripheral arteries is dependent on an increase in length. It seems rational to suppose that the morphologic and functional changes in the capillaries of patients with vasomotor disorders are due to a disturbed innervation, which affects them in a similar manner.

9. Raynaud, M.: On Local Asphyxia and Symmetrical Gangrene of the Extremities, translated by T. Barlow, London, Selected Monographs, New Sydenham Society, 1888, p. 144.

10. Lapinsky, M.: Studien über die locale Blutcirculation im Bereiche gelähmter Nerven, Arch. f. Anat. u. Physiol., Physiol. Abth,. 1899, suppl. 477.

CONCLUSIONS

In patients with vasomotor disturbances of the extremities, the capillary blood pressure in the fingers is low and the capillary flow is retarded during the period of ischemia or cyanosis. With the return of a normal color of the hands, the capillary pressure, as well as the blood flow, rises and approaches the normal. In most of these patients the capillaries of the fingers are longer and wider than in healthy persons, and often exhibit many convolutions and a bizarre architecture.

A PLEA FOR CLOSER RELATIONS BETWEEN CARDIOLOGIST AND ROENTGENOLOGIST

A MODIFICATION OF CARDIAC MEASUREMENTS, WITH A SIMPLE TECHNIC FOR LOCALIZATION OF THE HEART'S APEX BY MEANS OF THE CARDIOGRAM

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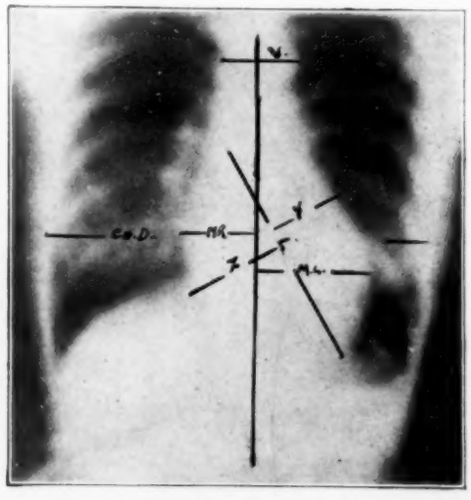
Cardiologists in private and institutional work are coming closer and closer to their colleague the roentgenologist, in an effort to isolate certain cardiac anomalies



Seven foot plate with seidlitz powder technic. The clavicles were included in the original plate. This important landmark was lost in the process of reducing, together with much of the detail. T = MR + ML.

by means of the cardiogram. It can safely be stated that few internists now call the cardiac examination complete until an accurate measurement of the heart's silhouette has been made.

There are two schools for the examination of the heart by means of the roentgen ray. The French,

through Vaquez and Bordet, rely entirely on the fluoroscopic findings, and the American, through Crane, Holmes and others, interpret the findings through a combined study, by the cardiographic and fluoroscopic means. Both schools have their advantages, though the former requires considerable more accuracy and is, therefore, more susceptible of error. Examination by means of the fluoroscope requires a costly installation, while an examination by means of the cardiogram, when carefully made by experienced hands, will give to the clinician the information he is seeking, that is, the change in volume of the cardiac chambers. It is true that the cardiogram will never show those modifications of the ventricular pulsation or the quality of the apical impulse. This the clinician can find by means of other methods.

TECHNIC

In the laboratory of U. S. Veterans' Hospital No. 36, the transformer is adjusted to feed the tube 60 milliamperes with a 5 inch spark gap. The patient stands before a 14 by 17 double screened film, 7 feet away from the tube, which is focused exactly in the midspinal line at a level with the spine of the eighth thoracic vertebra. The patient is given a glass of water followed by a tablespoonful of a solution of the white and a tablespoonful of a solution of the blue Seidlitz powder, separate, thus producing a large air bubble over a flat fluid level at the cardiac end of the stomach, which affords an excellent background for the exhibition of the heart's apex on the plate. The patient is ordered to take a full breath and to hold it, and a flash exposure is given. As it is important to register on the plate the full width of the thorax, the cassette is placed transversely, it being made sure that the clavicles are included in the field, as this is the best guide we have to know that the rays have been properly focused. Plates revealing distortion of the relation between the shadows of the proximal ends of the clavicle and the median line are discarded. After the plate is dried, lines are drawn, with a soft blue pencil, as in the accompanying illustration. The median line runs from above downward, started at a point equidistant to the proximal ends of the clavicle. At a right angle from this line a second one is drawn to the right border of the heart's silhouette (*MR*, middle right), another from the midline to the left border (*ML*, middle left). Then a fourth line is drawn from a hypothetic point placed 2 cm. internal to the junction of the third rib with a continuation of the curve of the right auricle, this point corresponding to the region where the uppermost portion of the right ventricle overshadows the origin of the aorta, downward to the visible apex (*L*, longitudinal), and finally two lines are drawn at right angles to *L*, one extending downward to the apex of the right cardiophrenic angle, and the other upward and to the left to the middle portion of the left border of the left auricular appendage. Then the internal chest diameter is measured at a level with the fifth rib in front, and the resultant figures are registered on a corner of the plate.

OTHER METHODS

This method, though based on the same principles, varies to a certain extent from that used by others in this respect. They determine the exact location of the apex by fluoroscopy, while we register it on the plate by means of the simple Seidlitz powder technic. Their longitudinal measurement consists of a line drawn between two hypothetic points, one at the right side just as the right auricular curve blends with the median shadow, and the other at the left costophrenic angle. We consider these two points hypothetic, because of the constant variance of the heart's position. It is obvious that the Seidlitz powder technic allows one to detect an enlargement or displacement of the heart downward without the aid of the fluoroscope.

DIAGNOSIS

The clinician pays little attention to a systolic murmur unless it is accompanied by a cardiac enlargement; and regardless of the skill in the art of percussion, time and again the cardiogram reveals a hypoplastic heart in a patient who has lived through the restrictions of a cardiac life because of a systolic murmur, the result of overcrowded valvular structures in an unusually small heart accompanied, perhaps, by a series of symptoms of nervous origin first described by Dr. Thomas Lewis under the name of "effort syndrome." My experience has been that a diagnosis of organic heart lesion in a young person should be made with great reluctance and never after a cardiogram has failed to show a disturbance in any given measurement, or a cardiothoracic ratio above 50 per cent.

We believe that the diagnosis of pericarditis with effusion is rather conclusively made from the cardiogram alone, for no other condition will make the heart's silhouette assume the characteristic "flask shape." When this is discovered, we usually take additional cardiograms with the patient standing, forcibly bent toward the right or left side and lying down on either side, thus bringing about a disfiguration of the heart's silhouette due to the change of fluid level. In early cases, however, when the fluid is scanty, it is safer to check up on the plate findings with a fluoroscopic study, in which the diffuse, feeble, far off cardiac action, with an almost imperceptible apical impulse and perhaps the loss of auricular and ventricular markings, will tell the tale. Sometimes an acutely dilated heart will give a similar picture; but the change in shape of the heart with change of position of the patient will differentiate effusion from acute dilatation. Then, too, the latter is of very short duration.

Myocardial degeneration usually shows roentgen signs which, though not altogether conclusive, constitute at least an important link in the diagnostic chain on this morbid entity; for in time it brings about a definite cardiac enlargement, and the curves representing the left auricular appendage and the pulmonary artery are not discernible in most cases.

A beef-tongue-like heart silhouette means, almost always, a senile heart, the "dying myocardium" of cardiosclerosis. In these cases, the longitudinal diameter is increased out of proportion to all others. This also happens with the cylindric, vertical, hypoplastic heart of the undernourished; but the senile heart invariably assumes a transverse position. Persistent hyperthyroidism of long standing may cast a heart shadow showing clearly the cardiac enlargement with an increase of the longitudinal diameter, thus resembling closely the senile heart; but in contrast with the absence of the curve of the left auricular appendage, we find here a very marked increase of the *Y* measurement, out of proportion to all others, denoting an enlarged left auricle. These changes are probably the result of the toxemia bringing about a persistent tachycardia which does not allow the proper, timely emptying of the auricle, in turn giving rise to an ultimate hypertrophy and dilatation of this chamber.

The mechanism of valvular disease, generally speaking, does not seem to be interfered with by the causative factors, although we are well aware of the fact that in an aortic lesion, in all probability, we are dealing with syphilis, while rheumatism clearly predominates in mitral lesions. The diagnosis of mitral disease

is relatively easy to make by means of the roentgen ray. The fact that a leaking valve reveals a certain amount of stenosis, and vice versa, does not seem to change the picture; for, regardless of which condition predominates in well established mitral disease, the cardiogram will invariably reveal an enlarged heart, with the *Y* and *T* measurements increased out of proportion to all others; an increase above 50 per cent. of the proportional area occupied by the heart's silhouette in relation to the internal chest diameter (cardiothoracic ratio), and last, but by no means the least, a disturbance in the ratio between the *T* and *L* measurements. According to my personal observations, this constitutes what I dare to call the pathognomonic roentgen sign of mitral disease. In a normal heart the *L* measurement is in the neighborhood of 2 cm. longer than the *T*. The *L* measurement, having been taken from the junction of the right ventricle shadow with that of the aorta at its origin, to the apex, is an expression of the length of the heart by the way of the right ventricle, and, naturally, is not affected by an enlargement of the left heart, the resultant of mitral disease. On the other hand, the *ML*, which, as shown in the diagram, is a component of the *T*, is increased because of the increase in volume of the left ventricle. Lesions of the right heart and cardiorenal disease may bring about an increase above 50 per cent. of the cardiothoracic ratio, but never in our experience disturb strikingly the ratio between the *T* and *L* diameters. This disturbance is shown occasionally in cases of aortic lesion, though not quite so marked; but in these cases there are no changes in the *Y* measurement because the mechanism of the left auricle is not affected. It is obvious that this pathognomonic sign appears rather late in mitral disease, the increase in the *Y* measurement appearing much before this sign is in evidence. Later in the disease, when the pulmonary blocking is well established, a cardiogram places before us the characteristic picture of cardiorenal disease, with all measurements equally increased as the result of the enormous size of the cardiac silhouette.

Mitral stenosis, in its incipience and when occurring alone, reveals no cardiac enlargement, judging from the cardiothoracic ratio and from the ratio between the *T* and *L* measurements, for the simple reason that in this type of cardiac lesion in its early stages the ventricles are not affected. The only cardiographic sign discernible is the excessive length of the *Y* line. Later on, as the disease progresses, the curve of the pulmonary artery becomes quite prominent, and the *Z* measurement increases, denoting increase in volume of the right ventricle.

Extensive rheumatic endocarditis with involvement of all the valves brings about a uniform cardiac enlargement. The heart's silhouette resembles in shape that seen in cases of cardiorenal disease, but the enlargement is not nearly so pronounced.

Pure aortic stenosis offers a cardiogram showing a moderate enlargement of the left ventricle with increased *ML* distance, slight disturbance in the ratio between the *T* and *L* measurement, a cardiothoracic ratio slightly above 50 per cent., and at times an excessive prominence of the aortic knob. The remaining measurements are not disturbed.

Vaquez and Bordett attribute the dilatation of the pulmonary artery to pathologic changes at the pulmonary valve. Although this condition has been detected by us in a considerable number of cases, we have failed on physical examination to find any distinct cardiac murmur, though the majority of cases showed a reduplicated loud pulmonary sound, accompanied by a symptomatology that led one to suspect the presence of an organic cardiac lesion before the examination. As to Vaquez and Bordett attributing this dilatation of the pulmonary artery to pathologic changes at the pulmonary valve, how could it be explained mechanically? Is such a lesion as pulmonary stenosis or insufficiency recognized by our authors as an isolated condition? We believe that it is not. It is considered an uncertain pathologic entity, to such an extent that it has been denied a place in cardiac pathologic circles by well known cardiologists. I have found little literature on this subject; but during the first few months after the armistice, I found in U. S. General Hospital No. 2 a moderate enlargement of the pulmonary artery almost constant in bronchial patients who had inhaled deleterious gases. I think that the dilatation could readily be explained in those cases as being due to the congestion of the lung parenchyma and the subsequent blocking of the blood stream.

The roentgen-ray findings of tricuspid disease, although not always conclusive, are rather confirmative, once the disease has been established clinically. The right auricle is seen bulging to the right at its middle portion, giving rise to the lengthening of the *MR* line. The moderate enlargement of the right ventricle is shown by an increased *Z* measurement, and in advanced cases the increased length of the longitudinal diameter takes place.

I earnestly believe that a cardiographic examination in patients offering cardiac symptomatology is well worth while. It helps the clinician in the difficult task, not only of arriving at a definite diagnosis, but also in outlining a defensive course for his patient; for it is the condition of the heart muscle, as revealed by hypertrophy or dilatation, that concerns him most.

No roentgenologist, regardless of his experience, should attempt the diagnosis of cardiac lesions on roentgen-ray findings alone, just as a clinician cannot make a diagnosis based on a few symptoms or on scattered signs. All factors should be considered, and, bearing the interest of the patient at heart, the cardiologist and the roentgenologist should march hand in hand striving for a better understanding of heart disease.

I have tried to show in this cardiographic study, in a general way, how much information can be furnished to the cardiologist by careful tracings on a cardiogram. The findings should be cautiously considered in their intrinsic, scientific value, because it is to be remembered that we are dealing with a human organ, the size, shape and position of which varies with the individual. If these factors were constant, so also would be the different measurements, and the proportions among one another; and our findings would be definite, conclusive and accurate. Hence my plea for closer relation between the cardiologist and the roentgenologist.

Examination of Food Handlers.—According to a recent bulletin of the New-York City Department of Health, the usefulness of the food handler activities of the bureau of preventable diseases has again been demonstrated. In the course of a year in the Manhattan Occupational Clinic alone, 32 cases of active pulmonary tuberculosis and 18 inactive cases were discovered. In Brooklyn, 4 active cases and 93 inactive ones were discovered, and in Queens only 2 inactive ones were brought to light. In addition, 15 cases of inactive syphilis were found in Manhattan, and 15 active and 76 inactive ones in Brooklyn. In the course of the year, 5 typhoid carriers were found in Manhattan and 2 in Queens.

THE CONCENTRATION OF UREA IN SALIVA *

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In order to determine whether the concentration of urea in the saliva is of clinical importance in the diagnosis and prognosis of nephritis, quantitative urea estimations were made on the saliva of a small group of nephritic patients under observation at the Mayo Clinic during the last three months. The quantitative excretion of urea in the urine and its concentration in the blood have been studied extensively. Various observers have recognized that urea is excreted in the sweat, gastric juice, feces and saliva of nephritic and uremic patients; but such work has consisted mainly in qualitative estimations, and few quantitative estimations are on record.

Schöndorff [1] has given a comprehensive review of the early work on this subject. Pettenkoffer [2] and Wright [2] were the first to note that urea is present in appreciable amounts in the saliva of healthy persons and in patients with nephritis. Later, many isolated quantitative estimations were made by Picard,[2] Poisseuille,[2] Bechamp,[2] Gréhant [2] and others; but the inexact method of their day (the sodium hypobromite method) gave data, some of which are unreasonable in the light of modern technic. In individual instances, however, Picard and Gréhant found 35 mg. of urea per hundred cubic centimeters, and Bechamp 30. Fleischer [2] did not recover urea from the saliva of a healthy person after pilocarpin administration; but he demonstrated its presence in the saliva of persons suffering from nephritis. Debove and Dreyfous [3] obtained 5 gm. of urea in 400 c.c. of saliva from a uremic patient after the injection of pilocarpin.

Kyle [4] and Le Roy [5] have made observations of clinical importance with regard to the chemistry of saliva in normal persons. Herzfeld and Stocker [6] have studied the presence of uric acid in saliva. Anrep,[7] Wolf and Barcroft [8] have carried out metabolic studies on the salivary glands of animals. With these exceptions, the metabolism of the salivary gland and the chemistry of saliva are given little consideration in the literature.

We have constantly found a certain amount of nitrogen in the saliva of man, which we believe to be derived wholly or mainly from urea. The amount of urea in the saliva bears a very close relationship to the amount of urea in the blood. This suggests that urea reaches the saliva by diffusion, and the physical properties of urea are such that its diffusion is to be expected.

Anrep considered the saliva as both a specific and a nonspecific excretion. The specific fraction contained mucin nitrogen, while the nonspecific fraction contained nonmucin nitrogen. As electrical stimulation of the chorda tympani of a dog progresses, the total nitrogen diminishes, the specific excretion, which includes mucin nitrogen, soon becomes exhausted, and the nonmucin nitrogen fraction alone continues (Chart 1). Anrep determined that the excretion of the nonmucin nitrogen, which remained constant, was independent of the mucin nitrogen. This was in accord with the studies of Pavlov,[9] and in contradistinction to the views of Heidenhain [9] and Langley,[9] who believed that the turning out of all the organic substances by the gland cells is accompanied, but not at the same rate, by a formation of all kinds of fresh cell substances. In the experiments of Anrep, an exercised and exhausted gland, when compared to the unexercised gland on the opposite side, was found to have lost nitrogen, but to a less extent than the nitrogen found in the saliva. He concluded, therefore, that the gland takes up protein during excretion. It is equally possible that the constant nonmucin nitrogen fraction which Anrep believed to be derived from an unlimited source, the lymph, is, in reality, urea constantly passing as such from the blood to the saliva. Our experiments support the latter view.

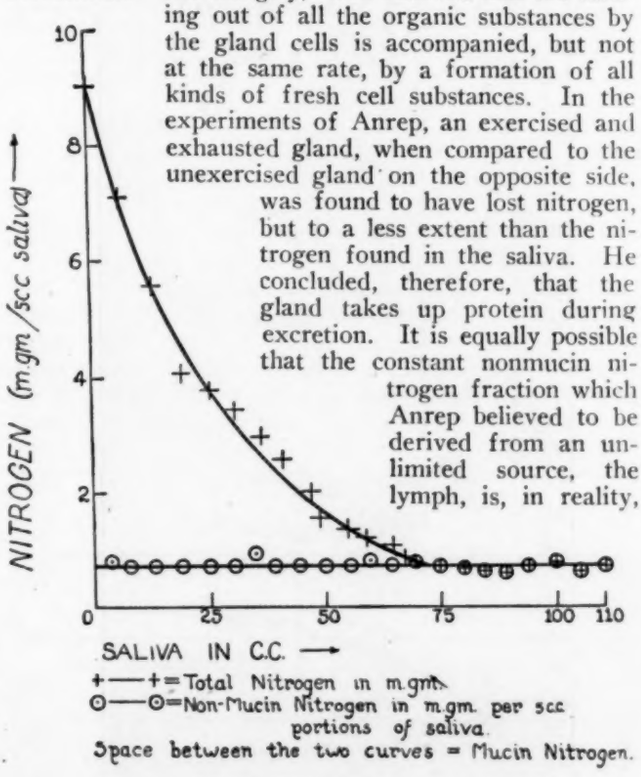

Chart 1.—Salivary gland metabolism (from Anrep).

We have centered attention on the combined urea and ammonia nitrogen value, which will be referred to as the combined nitrogen. That combined nitrogen is the proper basis for comparison is obvious, since if the urea nitrogen only is computed, an inconstancy of values is inevitable, owing to the tendency of urea to hydrolyze rapidly into ammonium carbonate. In individual cases, subtraction of the free ammonia nitrogen from the combined nitrogen often reduces the urea nitrogen to a trace, whereas our experiments show that in these cases the ammonia nitrogen is derived largely or entirely from urea. Factors influencing the amount of urea breakdown are the length of time the saliva has remained in the gland, and the hygiene of the mouth. It has been noted by Le Roy and others that there is more ammonia in a filthy, than in a clean, mouth. Since the urea values, as determined, are

* From the Division of Medicine, Mayo Clinic and Mayo Foundation, Rochester, Minn. Similar studies have been carried out on the gastric contents of a like group of persons, and the results will be published in a subsequent paper. Quantitative studies of salivary creatinin are also being attempted, with rather unsatisfactory results.

1. Schöndorff, B.: Die Harnstoffvertheilung im thierischen Organismus und das Vorkommen des Harnstoffs im normalen Säugethiermuskel, Arch. f. d. ges. Physiol. **74**: 307-356, 1899.
2. Quoted by Schöndorff (Footnote 1).
3. Debove and Dreyfous, quoted by Achard, C.: Le rôle de l'urée en pathologie, Paris. Masson et Cie, 1912.
4. Kyle, D. J.: Chemistry of Saliva in Relation to Hay-Fever, J. A. M. A. **49**: 402-406 (Aug. 3) 1907.
5. Le Roy, B. R.: Colorimetric Analysis of the Saliva, with the Clinical Significance, New York M. J. **87**: 448-450, 1903.
6. Herzfeld, E., and Stocker, A.: Ueber das Vorkommen von Harnsäure im normalen und pathologischen Speichel, Zentralbl. f. inn. Med. **34**: 753-757, 1913.
7. Anrep, G. V.: The Metabolism of the Salivary Glands. I. The Relation of the Chorda Tympani to the Nitrogen, J. Physiol. **54**: 319-331 (March) 1921.
8. Wolf, C. G. L., and Barcroft, J.: The Metabolism of the Salivary Gland. I. The Nitrogen Metabolism of the Resting Gland, J. Physiol. **49**: 95-112, 1915.
9. Quoted by Anrep (Footnote 7).

likely to be misleading and inconstant, the combined nitrogen values are considered as the index and basis of comparison, as the fulcrum on which the ammonia and urea values change in the process of urea hydrolysis.

TECHNIC AND FINDINGS

The determinations of ammonia and urea nitrogen were made by the urease method of Marshall,[10] and of Van Slyke and Cullen.[11] Chart 2 is the curve of salivation for one hour in a patient with urea retention. In it is contrasted the marked variation in the estimated urea values with the relative constancy of the combined nitrogen values. Table 1 also demonstrates this point. In Case 9, there was only a trace of urea nitrogen, whereas the combined nitrogen was a high normal value.

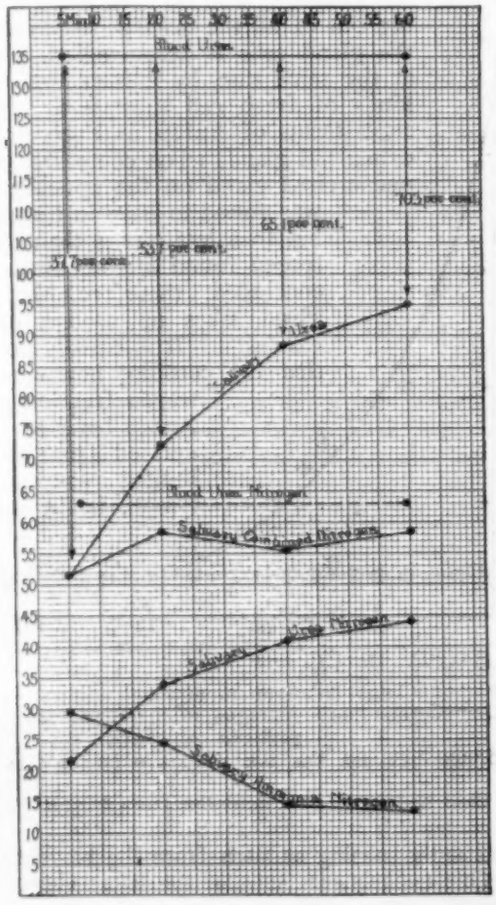

Chart 2.—Curve of salivation for one hour in a patient with urea retention. The figures represent milligrams for each hundred cubic centimeters.

Table 2 indicates that the ammonia nitrogen in the saliva is derived from urea. In the saliva from an unwashed mouth the ammonia nitrogen fraction is high, as the saliva has been acted on by urea-splitting agents, such as bacteria, while, after the mouth has been washed, the ammonia nitrogen fraction is low. In both the washed and the unwashed mouth, the combined nitrogen values are practically constant and within normal limits.

According to the data in Table 3, there is no exhaustion of the combined nitrogen fraction of the salivary excretion, and there is no factor of dilution as salivation progresses. Table 4 demonstrates that the administration of pilocarpin does not change the constancy of the combined nitrogen or introduce dilution factors. Table 5 again emphasizes the constancy of the combined nitrogen value. On allowing the saliva to stand outside the mouth for a short time, little change in the various normal values is obtained. When, however, it remains outside the mouth for several hours, the urea may be split; the urea nitrogen value is lowered to the profit of the ammonia nitrogen, but the combined reading remains constant.

TABLE 1.—CONSTANCY OF COMBINED UREA AND AMMONIA NITROGEN VALUES AND INCONSTANCY OF UREA VALUES OF THE SALIVA OF NORMAL PERSONS

Case	Ammonia Nitrogen, Mg. for Each 100 C.c.	Combined Nitrogen, Mg. for Each 100 C.c.	Urea Nitrogen, Mg. for Each 100 C.c.	Urea, Mg. for Each 100 C.c.
1	0.98	6.08	5.05	10.8
2	5.67	6.19	0.52	1.11
3	3.06	6.45	3.39	7.3
4	1.12	6.87	5.75	12.1
5	6.75	7.23	0.48	1.02
6	4.06	7.56	3.5	7.49
7	3.92	8.1	4.18	8.95
8	6.65	9.25	2.6	5.55
9	11.6	12.5	0.9	1.92

TABLE 2.—EFFECT OF ORAL HYGIENE ON AMMONIA NITROGEN, UREA NITROGEN AND UREA VALUES OF THE SALIVA: SALIVARY PERIODS ONE HOUR EACH

	Mouth Not Washed				Mouth Washed			
Time, Minutes	Ammonia Nitrogen, Mg. for Each 100 C.c.	Combined Ammonia and Urea Nitrogen, Mg. for Each 100 C.c.	Urea Nitrogen, Mg. for Each 100 C.c.	Urea, Mg. for Each 100 C.c.	Ammonia Nitrogen, Mg. for Each 100 C.c.	Combined Ammonia and Urea Nitrogen, Mg. for Each 100 C.c.	Urea Nitrogen, Mg. for Each 100 C.c.	Urea, Mg. for Each 100 C.c.
5	8.34	9.24	0.9	1.92	1.62	6.72	5.1	10.9
10	8.0	8.84	0.84	1.8	1.62	8.1	6.48	13.95
20	4.48	9.24	4.76	10.2	0.84	7.0	6.16	13.2
40	2.94	8.82	5.88	12.6	1.9	8.0	6.1	13.0
60	2.24	9.2	6.96	14.8	1.7	7.76	6.06	12.95

Estimation of the Salivary Combined Nitrogen of Normal Persons (Chart 3).—Sixty-four estimations of the combined nitrogen of the saliva were made on healthy persons without any relation to meals or oral hygiene. Sixty-two estimations fell between 6 and 13 mg. One abnormally low and one abnormally high value were encountered, which may possibly have been due to technical error.

TABLE 3.—CONSTANCY OF COMBINED UREA AND AMMONIA NITROGEN VALUES OF THE SALIVA OVER PERIOD OF SALIVATION WITH PARAFFIN

Time, Minutes	Amount of Saliva in Each Specimen, C.c.	Combined Urea and Ammonia Nitrogen, Mg. for Each 100 C.c.
3	22	9.5
10	30	9.1
20	40	8.7
50	100	9.5

Estimation of the Combined Urea and Ammonia Nitrogen in the Saliva of Nephritic Patients (Chart 4).—Forty combined nitrogen estimations were made on the saliva of patients with urea retention. The combined nitrogen value was constantly above 13 mg., with one exception, in which the reading was 13 mg.

The Relation Between the Combined Nitrogen and the Blood Urea Nitrogen Values of the Saliva of

10. Marshall, E. K., Jr.: A New Method for the Determination of Urea in Blood, J. Biol. Chem. **15**: 487-494, 1913.
11. Van Slyke, D. D., and Cullen, G. E.: A Permanent Preparation of Urease and Its Use in the Determination of Urea, J. Biol. Chem. **19**: 211-228, 1914.

Twenty-Four Persons (Chart 5).—This curve shows that in all persons who had a normal blood urea nitrogen value, 16 mg. or less for each hundred cubic centimeters, the combined nitrogen of the saliva was less than 13 mg. for each hundred cubic centimeters. However, as soon as urea retention is evidenced by a rise in blood urea nitrogen above 16 mg. for each hundred cubic centimeters, the combined nitrogen value of the saliva also ascends in a curve which shows a tendency to follow the blood urea nitrogen curve. More data on comparative estimations are necessary in order to determine the exact relationship between the two curves. Two estimations are apparently abnormally high. The mouths of both patients were very filthy and the increased ammonia may have been due to pollution.

TABLE 4.—CONSTANCY OF COMBINED UREA AND AMMONIA NITROGEN VALUES OF THE SALIVA WITH ACTION OF PILOCARPIN, ONE-FIFTH GRAM BY MOUTH

Time, Minutes	Amount of Saliva in Each Specimen, C.c.	Combined Urea and Ammonia Nitrogen, Mg. for Each 100 C.c.
5	10	7.8
10	20	6.5
20	32	7.5
40	60	7.2
60	65	7.7

POSSIBLE SOURCES OF ERROR

In most of the estimations, the saliva was collected without any relation to meals or oral hygiene. Nevertheless, the constancy of results speaks against any great source of error on this account. In future investigation, it would be well to improve the technic as follows: The patient should be required to rinse the mouth well with water or dilute acetic acid, and to chew paraffin. After two or three minutes, about 25 c.c. of saliva should be collected, filtered through three or four thicknesses of gauze, and estimations made on 5 c.c. of the filtrate, neutralized approximately to methyl red.

TABLE 5.—EFFECT OF ALLOWING SALIVA TO STAND AT ROOM TEMPERATURE FOR TWO, FIVE AND EIGHT HOUR PERIODS *

Case	Time	Ammonia Nitrogen, Mg. for Each 100 C.c.	Combined Ammonia and Urea Nitrogen, Mg. for Each 100 C.c.	Urea Nitrogen, Mg. for Each 100 C.c.	Urea, Mg. for Each 100 C.c.
Normal	Immediately	0.98	6.44	5.46	11.7
	After two hours	2.66	8.5	5.84	12.5
Normal	Immediately	5.07	8.71	3.64	7.7
	After five hours	6.3	9.38	3.08	6.1
Nephritic	Immediately	13.3	29.7	16.4	35.0
	After standing over night	27.7	30.8	3.1	6.7

* A slight increase in the combined ammonia and urea nitrogen values is noted after standing. It is possible that other reactions than that of the conversion of urea into ammonia are concerned in this increase.

Any extraneous sources of ammonia other than that from the saliva would increase the combined nitrogen value.[12] Such sources might be a filthy mouth and tobacco smoke, which contains a small amount of ammonia. Any substance, such as mercuric chlorid in the mouth wash or tooth paste, which might retard or destroy the action of the urease, would appear to lower the combined nitrogen value, since the fraction of urea failing to undergo hydrolysis would be missed.

12. Vaubel, W.: Ammonia Content of Tobacco Smoke, Chem. Abstr. **6**: 667, 1912.

The excretion of ammonia by the lungs may be disregarded. Experiments by Weisman,[13] Amoss,[14] Rosenau and Amoss,[15] and Krogh[16] show that there is no urea excreted by the lungs and only a faint trace of ammonia, if any. On analyzing the condensation liquid collected from five hours of respiration, Amoss recovered only 1.9 mg. of organic matter, all of which he considered to be ammonia. Even so, it is questionable whether the ammonia thus obtained was from droplets of saliva, or from nasal excretion.

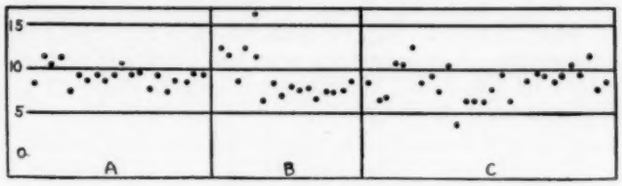

Chart 3.—Estimation of the salivary combined nitrogen of normal persons: *A*, twenty observations of combined nitrogen, in a normal person, over a period of three months; *B*, seventeen observations of combined nitrogen, in a normal person, over a period of three months; *C*, twenty-seven observations of combined nitrogen, in different normal persons. The figures represent milligrams for each hundred cubic centimeters.

POSSIBLE THERAPEUTIC IMPORTANCE OF FINDINGS

Whether salivation as a therapeutic procedure may ever become of value in urea retention is uncertain Values as high as 338 mg. of urea for each hundred cubic centimeters of saliva have been obtained. In many cases, it has been possible to salivate patients to the extent of 200 c.c. of saliva each hour, showing that from 3 to 4 gm. of urea can be disposed of by this method during the day. This is a considerable amount, since, in certain cases of uremia, no more than this is excreted by the urine. Prolonged salivation, which is

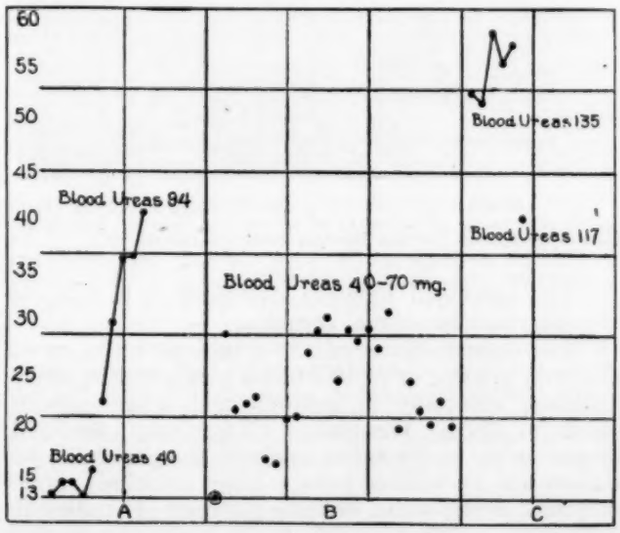

Chart 4.—Estimation of the combined urea and ammonia nitrogen in the saliva of nephritic patients: *A*, the same patient at different periods; *B*, twenty-four different nephritic patients; *C*, six observations on two nephritic patients. The figures represent milligrams for each hundred cubic centimeters.

13. Weisman, C.: Biochemical Studies of Expired Air in Relation to Ventilation, Biochem. Bull. **2**: 558, 1912-1913.
14. Amoss, H. L.: Organic Matter in the Expired Breath with Especial Reference to Its Inhibiting Power on Oxidizing Ferments, J. Exper. Med. **17**: 132-151, 1913.
15. Rosenau, M. J., and Amoss, H. L.: Organic Matter in the Expired Breath, J. Med. Res. **25**: 35-84, 1911-1912.
16. Krogh, A.: Experimental Researches on the Expiration of Free Nitrogen from the Body, Skandin. Arch. f. Physiol. **18**: 364-420, 1906.

often aggravated in those patients to whom it might be of real value, is, however, so incommodious that its use therapeutically is questionable.

CONCLUSIONS

1. The results thus far obtained in normal persons indicate that the combined urea and ammonia nitrogen values of the saliva are normally between 6 and 13 mg. for each hundred cubic centimeters, representing between 13 and 27 mg. of urea for each hundred cubic centimeters. The combined urea and ammonia nitrogen values of the saliva closely approximate those of the urea nitrogen of the blood.

2. In urea retention, the combined urea and ammonia nitrogen of saliva always increases with an increase in the blood urea nitrogen.

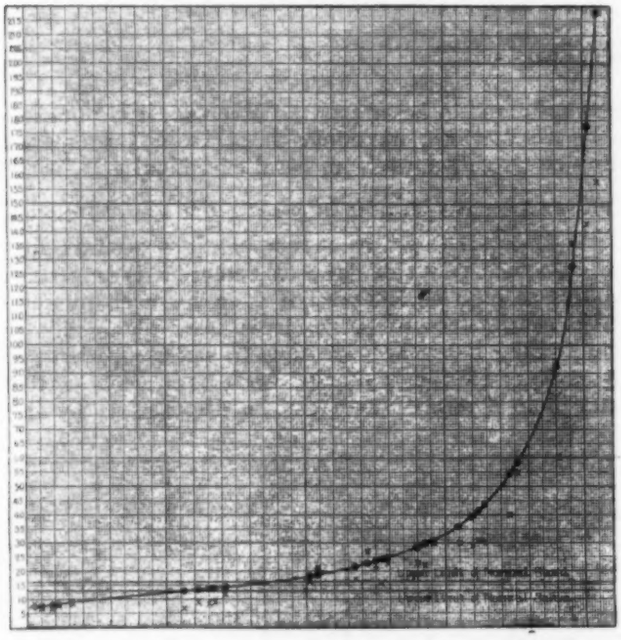

Chart 5.—Relation between the combined nitrogen and the blood urea nitrogen values of the saliva of twenty-four persons. The figures represent milligrams for each hundred cubic centimeters.

3. The combined nitrogen of saliva is a valuable index of renal functional capacity.

4. The determination of the combined nitrogen of saliva may precede or replace blood urea nitrogen determinations, especially in children and other persons difficult to bleed. The finding of a normal combined nitrogen value in the saliva excludes the possibility of an abnormal blood urea value. High combined nitrogen values in the saliva indicate the need of studies of the blood.

Child Care in Rural Communities.—In a report just issued by the U. S. Department of Labor through the Children's Bureau, entitled "County Organization for Child Care and Protection," the most recent administrative advances in the local care of dependent, defective and delinquent children are described. It is stated that care for these children by local boards of citizens, employing trained workers and aided by state boards, is gaining approval in an increasing number of states. The greatest difficulty about these organizations is securing executives trained for such work, it is stated. State universities, now, however, are preparing students to return to their home communities and take up this career, and state boards make possible the interchange of experience through conferences, publications and other means.

CENTRAL RETINITIS WITH RECOVERY OF NORMAL VISION *

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Retinal inflammations incident to serious constitutional diseases have been of interest to general practitioners and ophthalmologists ever since the invention of the ophthalmoscope made their observation and study possible. The importance justly attributed to the early recognition of such lesions has not been due primarily to the possibility of saving eyesight but rather their significance in the diagnosis and prognosis of the general malady.

Not infrequently an active and apparently healthy person, aroused by an impairment of vision, shows on ophthalmoscopic examination such characteristic lesions that the oculist is almost enabled to name the disease and predict the outcome. Unfortunately, the treatment then undertaken by the internist or family physician may be limited to belated and more or less hopeless efforts to save life. The loss of eyesight which gave the first warning naturally becomes quite a secondary matter. Perhaps an exception should be noted among cases of threatened blindness due to albuminuric retinitis of pregnancy. Under these circumstances the induction of premature labor with sacrifice of the immature fetus to save the mother's eyesight has been performed and may be fully justified. However, it is not only the eyesight of the mother but the danger to her life as well which demands this procedure.

The purpose of this report is to emphasize the possibility of saving eyesight by accurate diagnosis and prompt and proper treatment when the retinitis is due to certain localized infections and is not actually caused by a constitutional disease which may happen to be present or suspected.

Neither the presence of glycosuria nor albuminuria precludes the possibility that the retinal lesion may be caused by a focal infection. In fact, it appears in two cases here reported that the glycosuria and albuminuria, as well as the ocular lesion, were due to the focal infection.

With reference to the relation between localized infections and ocular tuberculosis, personal clinical observations seem to justify two conclusions: (1) A focal reaction in certain nasal sinuses occurs simultaneously with the focal ocular reactions in most cases after hypodermic test injections of tuberculin; (2) radical treatment of the focal infections in the nose or throat is followed by control and cure of the ocular lesion.

This applies as well to the more frequent lesions of the uveal tract or cornea as to those of the retina. So satisfactory has been the result of the immediate elimination of focal infections, such as diseased tonsils and infected sinuses accompanying these tuberculous ocular lesions, that the therapeutic use of tuberculin has rarely been required.

When syphilis is known to be present, there is a strong tendency to attribute all local ocular disease to

* Read before the Section on Ophthalmology at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.

the constitutional infection. In the majority of cases this is quite correct, but possible exceptions must be given due consideration.

In old age, loss of vision due to degenerative changes in the macula may be merely a local manifestation of general arteriosclerosis. It may also be caused by the effect of toxins generated by inflammations in the accessory nasal sinuses. Notable improvement in vision following the treatment of the sinus may be accepted as proof of the etiology.

The list of cases has been limited to those in which there was a return to normal vision, with such direct improvement following the treatment of the focal infection that the etiologic relation might be deemed unquestioned.

REPORT OF CASES

CASE 1.—Miss T. L., aged 23, white, first examined, Nov. 23, 1909, had had "disturbed" vision of the right eye for two weeks. The patient and her relatives were alarmed by the grave prognosis as to life and eyesight, by an oculist in an adjoining state, based on ophthalmoscopic examination, urinalysis, etc. Vision of the right eye was 16/12; of the left eye, 16/12. The field of vision for the right eye showed retraction above and below and a paracentral scotoma about 5 degrees in width extending through 60 degrees of arc in the lower temporal quadrant about 10 degrees from the center. The field of vision for the left eye was practically normal.

Ophthalmoscopic examination of the right eye revealed hemorrhagic retinitis, numerous small superficial retinal hemorrhages, and patches of white fibrinous exudate most abundant about the macular zone; the disk margins were not obliterated, but the vessels were somewhat elevated and tortuous; physiologic cupping was quite deep; the media were clear. The media of the left eye were clear, and the fundus was normal.

The general history was negative. The patient had occasional headaches. There were bloody and purulent discharges from the nose. The patient had been advised two years before to have an obstruction in the right nostril removed, but nothing had been done. She was referred to Dr. Greenfield Sluder for nasal examination and to Dr. William Rush for urinalysis.

November 24, the second day, there was no change in the ocular condition. Dr. Sluder reported severe sphenoidal suppuration on the right side for which he instituted treatment. The left side was normal.

November 25, the third day, vision in the right eye was less clear (16/19+). The ophthalmoscope revealed a fresh hemorrhage near the macula of the right eye. Dr. Rush reported the specific gravity of the urine 1.024. A trace of albumin was present. The sugar was between 0.5 and 1 per cent., and there was one granular cast. The patient had had some polydipsia, also pruritus and mental hebetude for several months.

November 28, the sixth day, vision was no longer blurred subjectively, and on trial showed 10/10+ for each eye. The ophthalmoscope revealed no fresh hemorrhages, and pulsation of the vein was clearly visible at the bottom of a physiologic excavation measuring 3 diopters in the right optic disk. Dr. Rush reported no albumin, and sugar less.

December 1, the ninth day, vision remained excellent. The fields of vision were normal in outline, and scotoma was smaller. The ophthalmoscope revealed the retinal details more clear. About this time, without any restriction or change in the diet, the urine no longer showed abnormal contents.

Jan. 24, 1910, at the end of the second month, the patient had been constantly under the care of Dr. Sluder. On two occasions an acute "cold' was followed by several fresh retinal hemorrhages, but ophthalmoscopic examination of the right eye revealed the fundus practically restored to normal, with mere traces of the former hemorrhages. Vision was 16/10+ for each eye. Haitz cards revealed no central scotoma. A nasal operation to provide better permanent drainage was to be performed.

At the last examination, Sept. 16, 1915, after more than five years, the patient was in excellent general health, with no disturbance of vision. Right eye vision was 16/10; left eye vision, 16/10. The field of vision was normal, right and left. The ophthalmoscope revealed the fundus normal and media clear, right and left. The condition has been reported unchanged during the past year.

Evidently the very unfavorable prognosis was conscientiously advanced by the first oculist consulted in this case because he suspected a diabetic or albuminuric neuroretinitis. The glycosuria in this case may be explained by the close anatomic relation between the pituitary gland resting on the sella turcica just above the sphenoidal cell.

Macleod [1] states that pituitary extract "has a distinct effect on carbohydrate metabolism. After its intravenous or subcutaneous injection, a marked lowering in the tolerance for sugar is observed (page 652), usually to such an extent that glycosuria becomes established. Cushing and his pupils have concluded that the posterior lobe contributes an autacoid which stimulates the utilization of sugar in the body. Confirmatory evidence for this view is furnished by the observation that mechanical stimulation of the posterior lobe, such as is produced by puncturing it with a needle, is followed by a temporary glycosuria, which is said to be as pronounced as that following puncture of the diabetic center, provided glycogen is present in the liver. The production of this carbohydrate autacoid would appear to be under the control of the sympathetic nervous system, for it has been found by Cushing and others that stimulation of the superior cervical ganglion, which has been known for many years to be frequently followed by glycosuria, has this effect only provided the posterior lobe of the pituitary is intact. Even surgical manipulation of the pituitary may excite a hypersecretion of the pituitary extract, which would account for the glycosuria often observed after experimental excision or partial destruction of the pituitary. A similar irritation may be set up in disease of the gland."

It is quite conceivable that the presence of an active suppuration in the sphenoidal cavity may supply sufficient toxic irritation to produce a reaction in the pituitary gland similar to that noted in the preceding paragraph. This assumption is apparently confirmed by certain observations in the following case.

CASE 2.—H. H. H., a white man, aged 48, married, first examined, Dec. 2, 1915, reported the sight of the left eye blurred for five days. He had been confined to the house for about two months by a "bronchial cold." There had been some coryza for the last two weeks. There was no history of injury. He had never used glasses. Right eye vision was 16/60; left eye, 3/48. The right field of vision was normal, the left somewhat contracted above, with central scotoma extending about 5 degrees vertically and 10 degrees horizontally. The ophthalmoscope revealed papilledema, right and left, and a patch of retinal swelling between the macula and the disk in the left eye. The blood pressure was systolic, 150; diastolic, 95. The personal history was negative. There had been six children, of whom four were living. The patient's wife had one miscarriage, the cause of which was unknown. Urinalysis, a Wassermann test and nasal examination were advised. Dr. F. C. Simon reported sphenoidal suppuration on the left side, with a copious discharge, for which treatment was begun. The patient was given directions for some nasal treatment at home, as he could not remain in the city.

December 5, the fourth day, he returned to St. Louis, bringing the report of the family physician that a small amount of sugar was present in the urine, which was otherwise normal. Right vision was 16/30; left eye, 16/75. The patient noticed a marked improvement. Ophthalmoscopic examination with dilated pupil revealed fine irregularities in the retinal pigment near the macula of the right eye and more extensive pigment disturbance and a faint yellowish reflex from infiltration between the macula and disk, which now appeared to involve

1. Macleod: Physiology and Biochemistry, in Modern Medicine, Ed. 2, 1919, p. 770.

the choroid more than the retina in the left eye, especially when viewed with the stereoscopic ocular of a large Gullstrand ophthalmoscope. There was a small patch of infiltration near the temporal equator of the right eye. Papilledema of the right eye was more pronounced; of the left eye, slight. The patient was to remain at St. Luke's Hospital.

December 6, the fifth day, Dr. Simon reported a purulent discharge now present in the right sphenoid also, while the secretion from the left sphenoid was diminishing. Urinalysis at St. Luke's Hospital revealed tests for sugar positive.

December 7, the sixth day, the hospital laboratory reported the test for sugar negative.

December 8, tests for sugar were reported negative, but a trace of albumin and a few hyaline and granular casts were present in the urine. Right eye vision was 16/24; left eye, 16/38. Nasal treatment was continued by Dr. F. C. Simon.

December 11, the tenth day, right eye vision was 16/15; left eye, 16/30+. The patient went home for two days.

December 13, he returned. Right eye vision was 16/24; left eye, 16/30. Nasal treatment was resumed.

December 16, right eye vision was 16/19; left eye, 16/30+. The ophthalmoscope revealed beginning cicatricial delimitation of retinochoroidal infiltration between macula and disk in the left eye. A hypodermic test injection of old tuberculin, 1/2,000 mg., was made.

December 17, right eye vision was 16/24; left eye, 16/38. The ophthalmoscope revealed an edematous swelling in the retinal infiltrates near the temporal equator and macula of the right eye and at the nasal side of the macula of the left eye.

December 18, right eye vision was 16/24; left eye, 16/30. The ophthalmoscope revealed the reaction noted the day before subsiding. Dr. Buhman reported the Wassermann test positive (four plus). The patient went home for a few days. Mercuric ointment, 1 dram (4 gm.), daily, and 5 drops (0.25 c.c.) of saturated solution of potassium iodid, with daily increase, was prescribed.

December 21, right eye vision was 16/19; left eye, 16/24.

December 22, vision was the same. The field of vision was practically normal in outline for each eye, with only a tiny scotoma at the temporal edge of the point of fixation for the left eye.

December 28, right eye vision was 16/12; left eye, 16/24.

Jan. 4, 1916, the end of the first month, right eye vision was 16/15; left eye, 16/24+. The ophthalmoscope revealed moderate papilledema of the right eye and a well defined retinal scar in the left eye. There were beginning symptoms of ptyalism. The patient was directed to use the mercury inunctions only every two days, and increase the potassium iodid to 25 drops (1 c.c.).

January 12, right eye with +0.50 Cyl. Ax. 135° V. 16/12; left eye with +0.50 Sph., V. 16/24+. Lines of astigmatism chart were broken to left of center for the left eye. The ophthalmoscope revealed continued improvement in the appearance of the fundus. There was some maxillary tenderness. The interval between inunctions was increased to three days. The potassium iodid was to be continued, 25 drops three times a day.

January 25, the right eye vision with the same correction was 16/15; left eye, emmetropic, 16/19. The ophthalmoscope revealed the papilledema of the right eye slightly increased. Dr. Simon reported secretion again present in the right sphenoid.

February 8, the end of the second month, right eye vision with correction was 16/12; left eye with −0.50 Sph., 16/19+. Dr. Simon reported improvement in the right sphenoid. Constitutional treatment was continued.

March 14, the end of the third month, right eye vision was 16/12; left eye, 16/12.

May 10th, the end of the fifth month, vision was the same in each eye. The ophthalmoscope revealed the fundus normal right and left except for slightly irregular pigmentation at the right macula and a small retinochoroidal scar of triangular outline at the nasal margin of the left macula. The Haitz stereoscopic cards failed to detect any scotoma, right or left. Dr. Ravold reported, on general examination, no evidence of syphilis. Dr. Harris reported the Wassermann test negative.

November 1, the patient reported that he had been entirely well.

November 4, Wassermann tests made by three serologists showed, respectively, three plus, two plus and negative reactions. The patient refused to continue antisyphilitic treatment.

February, 1917, there was no change in the ocular condition. Right eye vision was 16/12; left eye, 16/12.

December, 1921, the patient reported his health and eyesight excellent.

The primary etiologic importance of the double sphenoidal abscess in relation to the ocular disease in this case appears to be established clinically beyond question. While vision continued to improve after the antisyphilitic treatment was begun, by far the greatest improvement occurred during the first ten days while the patient was receiving treatment only for the sinus infection. During this time the right eye gained in vision from 16/60 to 16/15, and the left eye gained from 3/48 to 16/30+. Nasal treatment was not discontinued when antisyphilitic treatment was begun, about the nineteenth day.

One might also find a suggestion for the diagnosis of retinal tuberculosis in the slight diminution of vision and noticeable increase in the retinal swelling following a test injection of $\frac{1}{2000}$ mg. of tuberculin. The strongly positive Wasserman test obtained about the same time completely overshadowed it. The subsequent history shows that tuberculosis as a factor in this case was properly disregarded. If ocular tuberculosis and syphilitic infection are both present, as, for instance, in cases of hereditary syphilis, personal experience has demonstrated that treatment with tuberculin is likely to be a disappointment unless the general health is first improved by vigorous antisyphilitic treatment. The academic question whether this man had syphilis at all or not may be left to the serologists. Convincing clinical evidence was conspicuous by its absence.

The retinal inflammation in the macular region was much more pronounced in the left eye, while the papilledema was more evident in the right. Both sphenoidal sinuses were involved. Knowing the possible variability in size and relation of these cavities to the optic canal, it becomes a matter of interest whether such a variation is the cause for the difference in the ocular manifestations in the two eyes.

Not the least interesting fact about both of these cases is the glycosuria present during the active stage of the localized sphenoidal sinus infection, which cleared up under treatment of the latter condition without corrective diet, etc.

The first case, which was monocular, bore some resemblance in ophthalmoscopic appearance to diabetic retinitis. The second, in which both eyes were affected, did not.

A report from Uthoff's clinic by Momoji Kako[2] indicates that nineteen out of forty-five cases of diabetic retinitis were monocular. A pertinent question, then, is, If the focal infection in the sinuses had been ignored, would these cases eventually have been classified as diabetic neuroretinitis? If so, how many cases that are thus classified might be traced to a similar origin if the sinuses had been examined?

In the next two cases, the direct influence of the sinusitis on the ocular condition causing the loss of vision was not complicated by any sign or symptom of constitutional disease.

CASE 3.—W. B., white, aged 19, a student at Princeton, whose home was in St. Louis, was first examined, April 27, 1921. Eighteen days before, while brushing his hair, he noticed that he could not see well with the right eye. Later the same day he noticed that his game of tennis was off, as he could not locate the ball. He consulted Dr. L. Webster

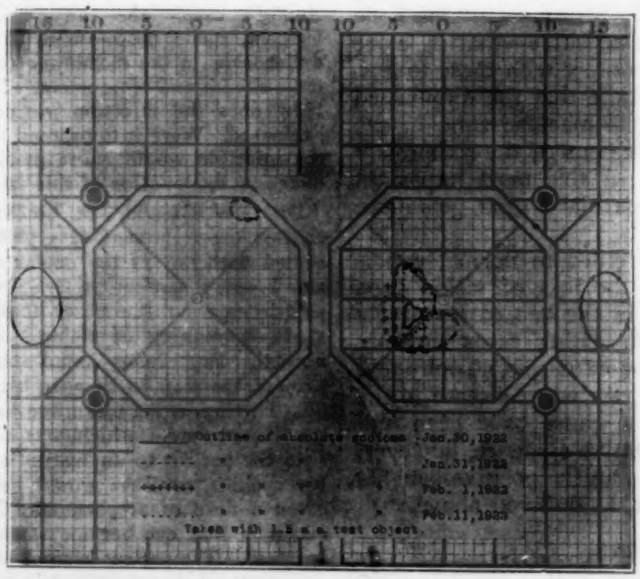
2. Kako, Momoji: Klin. Monatsbl. f. Augenh., 1903.

Fox of Philadelphia, who sent a chart of the visual field of the right eye showing central scotoma occupying the nasal half of the inner ten degree zone, and a very slight contraction in the outline of the extreme temporal limits. Dr. Fox enclosed a rough sketch indicating the size of the retinochoroidal lesion at the macula. Comparison with the present ophthalmoscopic appearance indicates progressive increase in the size of the lesion and pigment proliferation. Right eye vision was 16/192; left eye, 16/12+. Dr. Fox had eliminated the possibility of macular injury due to a blow on the right eye. He also had an examination made of the accessory nasal sinuses, and received a report that the examiner found everything normal. Not finding a more satisfactory solution of the question of etiology, Dr. Fox forbade the use of tobacco, and prescribed hydriodic acid. Dr. Fox had found the left eye normal in every respect, which was confirmed at this examination. An outline of the macular field of the right eye on Haitz stereoscopic charts with a 2 mm. test object revealed an absolute central scotoma extending fully 6 degrees downward, nasally and temporally, and irregularly about 3 degrees upward. A measurement of the size of the retinochoroidal lesion was made with the Gullstrand ophthalmoscope and measuring ocular. We advised a general physical examination, a Wassermann test, and special examination of the nose, throat and teeth.

April 28, the second day, Dr. Greenfield Sluder reported sphenoidal inflammation without pus on the right side, for which he had begun treatment. The ocular condition was unchanged.

April 29, the third day, Dr. Andrews reported the general physical examination negative. All constitutional treatment was discontinued. Right eye vision was 16/120; the patient noted positive improvement. The ophthalmoscope revealed retinochoroidal infiltration more sharply defined, with appearance of normal tissue between the proliferated pigment granules.

May 2, the sixth day, the Wassermann test was negative. Daily treatment by Dr. Sluder had been uninterrupted. Right eye vision was 16/24, a gain from 16/192 in less than one week.



Scotoma in Case 4.

May 7, the eleventh day, the right eye vision was 16/15. There was good depth perception with the stereoscope. Fundus examination of the right eye with dilated pupil with the Gullstrand ophthalmoscope revealed much normal retinal tissue between proliferated pigment. Measurement of the outer points of the outline revealed contraction in the size of the lesion.

May 12, the sixteenth day, right eye vision was 16/12; left eye, 16/10. Test with the Haitz stereoscopic chart revealed a zone of relative lack of clearness with the 2 mm. test object about one-third as large as the original absolute scotoma.

May 24, the end of the first month, right eye vision was 16/10; left eye, 16/8.

June 21, the end of the second month, right eye vision was 16/10+; left eye, 16/8 (apparently emmetropic). The ophthalmoscope revealed a thin scar moderately pigmented. Haitz cards showed no scotoma, either absolute or relative. There had been no further visual disturbance in this case.

Comment as to the probable etiology of the retinal condition seems superfluous in connection with the clinical history. It is manifestly our duty to insist on repeated examinations of the nasal cavity, in spite of negative reports, when no other satisfactory cause can be found to explain particularly lesions in the macular region.

CASE 4.—F. W. S., a white man, aged 32, single. previously examined for slight ametropia, when —0.50 Sph. —0.62 Cyl. Ax. Vertl. was prescribed for each eye in 1919, with which vision was 16/12, right and left, received a small superficial, scleral wound in the right eye, about 5 mm. below the limbus, from the corner of a screwdriver while tinkering with his automobile in August, 1920. A moderate traumatic iridocyclitis was followed by recovery without injury to visual acuity.

Jan. 30, 1922, he reported for examination on account of a spot near the center of vision of the right eye. With glasses, right eye vision was 16/15 (uncertain); left eye, 16/12+. Ophthalmoscopic examination of the right eye, with dilated pupil, revealed a tiny superficial yellowish white infiltration just above and to the temporal side of the macula. Test with the stereocampimeter revealed a triangular absolute scotoma covering several degrees below and to the nasal side of the center of fixation, as in the accompanying chart. General physical examination and immediate rhinologic examination was advised.

January 31, the second day, Dr. T. P. Brookes reported nothing abnormal in the patient's condition. Dental examination was negative. Dr. Greenfield Sluder reported postethmoidal and sphenoidal inflammation, with very thin pus, for which treatment had been instituted. Right eye vision was 16/120. The stereocampimeter revealed absolute scotoma very much increased in size, as indicated on the chart. The ophthalmoscope revealed a hazy, edematous swelling of the retina, with borders not definable, involving the macula and enveloping the apparent terminus of a tiny retinal blood vessel approaching the macula from the upper temporal direction, a second superficial infiltration was visible about one disk diameter removed, temporarily surrounding a tiny branch of the same retinal vessel.

February 1, the third day, right eye vision was 16/75. The ophthalmoscope revealed a beginning demarcation of the retinal swelling, with first signs of pigment cell proliferation. The stereocampimeter revealed absolute scotoma, diminished in size by 30 per cent., as indicated on the chart.

February 2, the fourth day, right eye vision was 16/38. The ophthalmoscope revealed the lesion more sharply defined and the swelling less.

February 3, the fifth day, right eye vision was 16/24.

February 7, the ninth day, the ophthalmoscope revealed definite cicatrization; the patient was examined also by Dr. F. E. Woodruff and Dr. E. H. Higbee.

February 10, the twelfth day, right eye vision was 16/38+; left eye, 16/10.

February 11, the thirteenth day, right eye vision was 16/24 (variable); left eye, 16/10. The ophthalmoscope revealed the presence in the right eye of a sharply defined retinochoroidal scar. In the left eye there was tiny infiltration with some pigmentation along the macular end of a small retinal vessel below and on the temporal side of the macula. Hitherto the left eye had shown no pathologic change. The stereocampimeter revealed a slight change in outline of the absolute scotoma for the right eye and a new absolute scotoma covering several degrees above and to the nasal side for the left eye.

On account of this extension to the left eye, Dr. Sluder decided that a radical double postethmoidal and sphenoidal operation was necessary. He operated, February 14, sixteen days after the first lesion was noticed.

February 17, fourth day after operation, the ophthmalmoscope revealed marked improvement, that is, definite cicatrization and shrinking of outlines of lesions right and left.

February 21, the eighth day after operation, the ophthalmoscope revealed a tiny shrunken retinal scar at the temporal side of the macula of the right eye, and no evidence of a retinal lesion of the left eye, with undilated pupil. The stereocampimeter revealed a small scotoma, not absolute, in the right eye, and no scotoma in the left eye.

February 25, the twelfth day after operation, right eye vision was 16/19; left eye, 16/15.

March 1, one month after the first attack, right eye vision was 16/12; left eye, 16/12 +. There was no evidence of any central scotoma, right or left.

The last case was seen early enough to confirm what Fuchs has emphasized in his recent lectures on pathologic conditions of the eye: that these retinochoroidal lesions in the macular zone probably most often begin in the retina.

Consideration of the anatomic relations makes it easy to understand how the toxic products, and possibly bacteria, of postethmoidal or sphenoidal inflammations can be conveyed by the perivascular lymphatics along the branches of the ophthalmic artery. Perhaps none of them supply a tissue more sensitive—that is, more likely to become inflamed by contact with these toxins, than the retina. We may assume that the diminished vascularity of the retina in the macular zone means greater vulnerability. Other regions of the retina may be affected, but the invasion of this most important zone for visual purposes, the macular region, gets more attention from the patient.

These cases all showed a return to normal conditions. In none of them had the loss of vision been noted quite three weeks, and in the last case scarcely more than twenty-four hours. Other cases showing destruction of central vision by extensive atrophy and cicatrization in the macular region when disease in the nasal sinuses was the probable cause have been and could be produced. Their negative evidence, however, could not be more convincing than the positive benefits obtained from nasal treatment, as outlined above.

CONCLUSIONS

1. Justice to the patient demands that possibility of focal infection be considered, even when symptoms of constitutional disease are present.

2. A negative report after a nasal examination is not final. The examination should be repeated in all ocular conditions susceptible of influence by disease in the accessory nasal sinuses, unless some other etiologic factor fully explains the case.

ABSTRACT OF DISCUSSION

Dr. Greenfield Sluder, St. Louis: Dr. Luedde brings out well how syphilis, albuminuria and diabetes may confuse nasal examination. The cases he reported gave me an opportunity to investigate. They were not obvious sphenoid cases. The changes were so slight that they might readily have been overlooked. In the first case, the sphenoid was opened and the glycosuria ceased. The second case was in a normal boy, aged 18, a simple nonsuppurative sphenoiditis. The outlet was in all probability a propitious one, and phenolized oil placed in the sphenoidal fissure under such circumstances (pressure) will overflow and go into the sphenoid. The treatment was exceedingly simple and the response was very prompt. Recovery was complete. The third case was submitted to operation immediately, because of the involvement of the other eye. The disturbance in the nose was scarcely more in evidence than in the second case. The response was prompt there also. As I recall it, the reaction following immediately in the wake of the sphenoidal surgery was enough to make the intraocular manifestation slightly more pronounced. That lasted two days, and subsided. It is timely to emphasize the small changes that may be responsible for ocular infection. Some years ago, Dr. Ewing sent me a man who had iritis with perception of light remaining. The same changes appeared in his nose that appeared in these cases. He did not get better with tentative treatment, so I opened his sphenoid cell which fortunately happened to be of large size. The shock of the surgery lowered his blood pressure, and the bleeding ceased. It was a perfectly dry operative field; I had a comprehensive opening and the ethmoid and nasal outlet were completely removed. I introduced a pharyngoscope and I saw on the optic canal a lesion with vessels focusing to its center, and the epithelium had a dirty gray appearance which faded out to normal at a radius of 1 cm. The patient wound up with 3/20 vision.

The question arises, too, What really is the relationship between postnasal disease and optic disorders? There are three basic observations on record in this association. One is that of Uffenordi who, in 1907, determined the anatomic connection of the optic canal and the sphenoidal sinuses. The second is the clinical observation I outlined in Dr. Ewing's case. The third observation was by Kleijn of Utrecht, made postmortem, in which he demonstrated the diplococcus in the membrane of the sphenoid and within the optic sheath and optic nerve. That sounds rather convincing. How does the infection proceed? Forward; almost never backward. Were it to proceed backward as often as forward, the infection would cause meningitis more often. I cannot offer any explanation of this fact.

Dr. J. W. Charles, St. Louis: I wish to sound a warning against the treatment of syphilis when sphenoiditis is connected with any of the ocular manifestations. A few years ago I sent a patient to Dr. Sluder because he had a slight papilledema on the nasal margin of one optic disk with slight dimunition of vision. The other eye was perfectly normal. Dr. Sluder found that he had a sphenoiditis. I advised the man to be operated on, but he wanted to put it off. Having in the meantime had every test made, including the Wassermann, which was four plus, I thought I would send the patient to an institution where he could be treated for syphilis, until he would consent to operation. He was given a dose of arsphenamin 0.5 gm., and immediately the vision in that eye became worse, and the other eye became involved. The patient became blind within a week and never recovered. I determined that it was a case of a Herxheimer reaction in the sphenoid which had involved the optic nerves.

Dr. A. E. Ewing, St. Louis: I wish to sound another note of warning, and that is that when you have these nasal cases you should place them in the hands of men who understand nasal work. I know of one instance in which one eye was lost completely and the other eye severly injured from a sphenoidal operation.

Dr. Edward C. Spitze, East St. Louis: Years ago I saw a patient with hemorrhagic retinitis, and a large pocket of blood behind the retina. A diagnosis of kidney disease had been made. A good laboratory diagnostician had found albumin and casts. I examined the eye and said that this diagnosis must be correct. For some reason his people were not satisfied and the patient came to Dr. Luedde. He had her sinuses investigated, and found a severe suppurative sinusitis. Examination of the urine was negative. Another case under my care now is that of a man who had a slight trace of albumin, with intense neuroretinitis in one eye. The albuminuria was treated and cleared up, but the eye condition became worse until we found we had a bilateral sphenoiditis and ethmoiditis. It took several weeks' treatment before he began to improve.

Dr. Joseph S. Richtenberg, Kansas City, Mo.: Two years ago, at the meeting of the American Academy of Ophthalmology and Oto-Laryngology, with Dr. Lorie, I reviewed a series of twenty-five cases of eye disease due to intranasal conditions. The points we made were: (1) that in the early

diagnosis of these conditions one of the most prominent symptoms is the enlargement of the blind spot; (2) that in cases in which nasal examination and the roentgen ray were negative, the rhinologist is perfectly justified in exploring the sinuses, and (3) that in some of the cases the sphenoid sinus goes from one side to the other, and the eye on one side would be affected by the disease in the opposite side of the sphenoid sinus.

DR. C. D. WESCOTT, Chicago: These cases certainly show the importance of complete examination of patients in the study of any intra-ocular condition. We must not conclude that because the Wassermann reaction is positive the eye lesion is due to syphilis, or that because the patient reacts to tuberculin the eye lesion is tuberculous. Unfortunately, we all have not the opportunity for such skilled assistance as Dr. Sluder has given in these cases. I believe great harm has been done by ill advised intranasal surgery.

DR. OLIVER TYDINGS, Chicago: In every case of eye trouble that comes under my observation, if there is any question about it, I always examine the nose. I cannot agree with Dr. Sluder in every case of eye pathology that we should operate on the sphenoid. I have operated on a large number of sphenoids without any disturbing symptoms but when I find the nose normal and have investigated the sphenoid, and there is no evidence of any pathologic condition, I think I am justified in withholding operation. I believe there is one serious source of trouble in all of these conditions which the medical profession has not taken into consideration, and that is the disturbance due to the vasomotor system on account of irritation produced at various points.

DR. GREENFIELD SLUDER, St. Louis: I have been misunderstood. My statement was that painstaking examination of the nose will reveal the presence of the disorder many times if the examiner has sufficient experience, and that the postethmoidal sphenoid operation is not to be trifled with; that it should not be undertaken as a routine or performed lightly.

DR. W. H. LUEDDE, St. Louis: The important thing is that all these patients got well and retained perfectly normal vision. The scotomas disappeared and the vision cleared up under treatment of the focal infection in the nasal sinuses. We see so many cases with central retinochoroidal scars that have never been explained satisfactorily that the report of these four cases in which the identical ocular inflammation began but subsided without the usual destruction may be of interest. No one would hold the sphenoid responsible for all such troubles, but the value of most careful examination and reexamination cannot be overestimated. Dr. Sluder's painstaking care and skill in diagnosis were strikingly illustrated by my experience in the case of a onesided optic neuritis with serious loss of vision in a young school teacher. A tonsillectomy had been performed a month before. Her original rhinologist was ready with an absolutely final negative diagnosis within five minutes after the case was referred to him. Neurologic examination was negative. On the following day, after an hour of repeated observations, Dr. Sluder made the positive diagnosis of sphenoidal suppuration on the affected side. A sphenoid operation resulted in restoration of good vision and cure of the optic neuritis. Hence the warning, not to rush too eagerly for a negative diagnosis. I know that Dr. Sluder does not operate in every sphenoid case. In the three cases of this series under his care, only one operation was done. In that case he did not operate until an extension developed, involving the other eye. The rule has been that when vision is improving and the nasal condition is subsiding satisfactorily under treatment, an operation is not recommended. Operative intervention has been regarded as the last resort. With reference to the greater frequency with which these sphenoidal infections seem to travel forward, I wish to offer the following explanation. The intimate anatomic relation of the optic canal is well known. Through this canal and foramen pass the optic nerve and the ophthalmic artery. The ophthalmic vein returns by the sphenoidal fissure and does not pass through the optic canal. The perivascular lymph currents everywhere coincide with the direction of the flow of blood within their respective vessels. Therefore, infectious matter and toxins reaching the optic nerve from these sinuses are more readily carried forward toward the ocular tissues by the perivascular lymphatics of the ophthalmic artery.

PRESENT-DAY STATUS OF SQUINT SURGERY*

A NEW OPERATIVE TECHNIC

OSCAR WILKINSON, A.M., M.D.
WASHINGTON, D. C.

Surgery of the ocular muscles for the relief of squint can be divided into two general classes: First, operations to weaken the overacting, or supposedly overacting, muscles. These have consisted of cutting the tendon or the belly of the muscle either entirely or partially, the object of which was to weaken or inhibit the pull of that muscle. Second, those operations whose purpose was to strengthen the weak or underacting muscles. This was accomplished by advancing the insertion of the muscle, by cutting off the end of the muscle and stitching it to the stump or to the sclera in front of the stump, and thus shortening it, or by some form of reefing or tucking. Before enumerating the virtues and defects of these methods I shall review the historical facts leading up to our present-day methods.

In 1737, the bombastic John Taylor—arch charlatan of his age—announced in the newspapers in Paris that he "could straighten squinting eyes by a slight and almost painless operation, and without fear of accident." What he did, or how, we shall never know.

Professor Stromeyer, in 1838, in a treatise on "Subcutaneous Orthopedics," described fully the procedure of tenotomy, but for want of courage or opportunity he had never performed his operation on the living subject. The first authentic tenotomy for the relief of squint was performed by Dieffenbach of Berlin, Oct. 26, 1839. Dieffenbach performed on the living subject the operation that had been performed on the cadaver by Stromeyer and which he described in his book in 1838.

The first tenotomies were tenotomies proper and not myotomies, in that they cut the muscle "close to the sclera." In their zeal to get more effect, they soon began to cut wider into the capsule and further back on the muscle. Dieffenbach himself was one of the first to do a myotomy. He says [1]:

> If the conjunctiva be divided over a greater arc and toward the back of the globe, if the cellular tissue be extensively separated, and the muscle be detached far back and divided at its middle, then the eye, even in cases in which the whole cornea was hidden in the internal angle, stands quite straight after the operation.

This cutting of the belly of the muscle and the complete detachment of the muscle and capsule were attended by such glaring deformities, external deviation, sunken caruncle, and exophthalmos, that the operation for squint came into bad repute. About this time, A. von Graefe admonished his colleagues to adopt a more conservative operative procedure. He described his method of operating, which differed very little from the original method of Stromeyer. He advised open-

* Read before the Section on Ophthalmology at the Seventy-Third Annual Session of the American Medical Association, St. Louis, May, 1922.

1. Dieffenbach: Deutsch. med. Wchnschr., July, 1840.

ing the conjunctiva closer to the cornea, making a small opening and doing a tenotomy as near the sclera as possible, and using afterward a conjunctival stitch. This operation is extensively practiced today.

These defects of tenotomy caused another operation to be developed: a strengthening of the weaker muscle. This was first devised by Dieffenbach to relieve an external deviation produced by a myotomy done by himself in 1842, but with little success. It was left for

Fig. 1.—Scales for measuring pull of muscle.

Guérin of Nancy in 1849 to give us a more practical procedure. This he applied in a case of secondary squint.

The first accurate description of an advancement operation was by A. von Graefe in 1857. This was his famous "Faden operation." The same year, G. Critchett of London described his three stitch advancement operation, which Beard said "might be called the parent of most modern advancement operations." In 1897, Landolt made some improvements on Critchett's advancement, and his operation is extensively practiced at present. Almost every advancement operation since has been more or less of a modification of Critchett's or Landolt's.

The hope, aim and ambition of each and all (and their names have been legion) have been to shorten the weaker muscle so as to make it cope with the overacting one, and this was done by muscular advancements (Critchett, Landolt, Weber, de Wecker, Prince, Verhoeff, Worth et al.); capsular advancements (Knapp, de Wecker, Fox); resections (Vieusse, Schweigger, Prince, Reese); reefs (Savage, Valk, B. Harman et al.); and by tucks (Todd, Bishop, Bruns, Clark, Briggs et al.); but in one and all of these were the element of inexactness and want of proper gaging of the operation and hence a variance of the end-results obtained. Then to obtain results there was the partial tenotomy and advancement—a combination of operations, both of which were inaccurate and left just as much to be guessed as heretofore—and it was just this element of inexactness and want of definite measurements which prevented us from operating on children at an early age before the vicious habits were formed

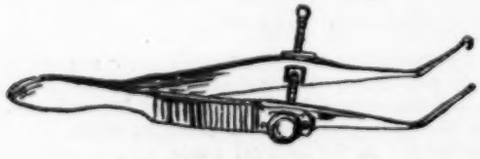


Fig. 2.—Calipers.

and before it was too late to secure the aid of nature in procuring that all important function—binocular vision, or fusion of the two images, to aid us in obtaining and maintaining straight eyes.

The advantages of tenotomy were its ease of execution, its slight reaction, and the time saved for the patient. Its disadvantages were its uncertain end-results, its bad after-effects, in way of sunken caruncle, external deviation, exophthalmos, and the interference with convergence. The latter is possibly the greatest fault, particularly in cases in which binocular vision can be secured.

The advantage of the tucking, advancement or resection operation is that we are restoring an eye to approximately normal function, by increasing the action of the weak muscle instead of decreasing the action of an overacting muscle, as in tenotomy. In other words, we are making a weak muscle stronger instead of making a strong muscle weaker. The disadvantages of this procedure as it has been performed are its inexactness, the amount of traumatism necessary to good advancement as compared to tenotomy, and the necessarily greater discomfort and delay from work, as well as after-redness and more prolonged recovery.

At present, in America, a slight tenotomy is preferred by many operators, while others do a combination of partial tenotomy and advancement, or resection, whereas a few men never do a tenotomy except for external deviation. In England, some form of advancement with a slight tenotomy, a weakening of the internus in severe cases, is the practice. While in France, largely as a result of the teaching of Landolt, advancement is the procedure of choice.

What we have been needing in our muscle surgery is a more exact measurement of the amount of advancement done in a given case, and a study of the amount of correction of a given deviation that a definite amount of shortening will produce.

Our trouble in the past has been twofold: In the first place we have not made sufficiently accurate, or a sufficient number of accurate measurements of our cross-eyed patients before submitting them to operation. We should measure the deviation under all circumstances: when the child is excited, when he is calm, when he is tired and when rested, with atropin and without, with glasses on and without glasses, and, finally, after glasses have been worn for months. It is my custom first to get the degree of deviation, atropinize the eyes ten days, take amount of deviation, order practically full refractive correction, then measure the deviation, and take a tropometric reading every thirty days for six months, using pads, atropin in the fixing eye, fusion training (Worth) and occlusion when necessary, and at the end of six months a study of one's records will tell him whether or not he must operate. If no improvement in vision, or fusion power, or decrease in the degree of deviation takes place, we not only should operate, but we must operate in all cases in which the patient is more than 3 years of age.

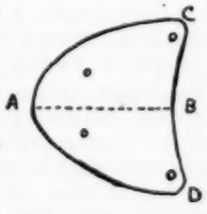


Fig. 3.—Strabismus brace: *A* to *B*, 11 mm.; *C* to *D*, 14 mm.; thickness, 0.5 mm.

Our second weak point in squint surgery was its inaccuracy. We hestitated to do a tenotomy, for no man could foretell its final result, no man could guess this in any case; hence we hesitated to assume the responsibility when the element of uncertainty was so great. Advancement operations gave us no more accurate, but perhaps less harmful results, even though at times some harm resulted. Thus, we found ourselves permitting patients to go till they were 10, 12 and 14 years of age before we would assume the responsibility of an operation. We waited until the hope of binocular vision was forever lost and the possibility of a functioning eye irretrievably gone.

To overcome the defects in squint surgery I have endeavored to devise an operation in which the exact

amount of shortening of a muscle can be measured; one in which the sutures are sufficiently strong not to give way or slip while healing takes place, and one which is as devoid of danger as any resection, tucking or advancement operation yet introduced. In order to secure more definite end-results, I have devised scales to measure the pull of the muscle, a caliper to measure more exactly the amount of shortening done, and a brace to insure healing of the muscle where it is left at the conclusion of the operation.

The above mentioned scales I now use in all cases to determine the amount of pull or resistance offered by the strong muscle. The scales are graded in grams. I have found that the average pull to a squinting eye is about 60 gm. Many will pull as much as 120 gm., and a few 150 gm.

The method of using the scales is as follows: The stay suture for holding the brace is placed underneath the tendon of the internal rectus muscle, as elsewhere described. This thread is knotted and the hook of the scales is caught in the thread. The eye is now pulled out until the edge of the cornea is brought to the outer canthus. The weight of the pull required to bring the eye over is registered on the scales and recorded. In local anesthesia the patient is required to fix with the good eye as the squinting one is pulled outward till the cornea reaches the external canthus. Under ether, the

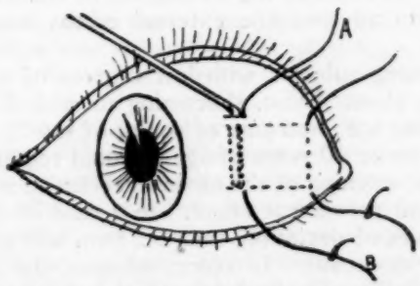


Fig. 4.—Method of introduction and position of stay sutures for strabismus brace.

same procedure is followed; but, of course, we have no fixing eye. The degree of anesthesia probably causes a variation in the pull; however, I have not found it so. I feel certain that a markedly overacting muscle will be thus detected despite that possible error. In cases with markedly overacting internal rectus I leave the brace in from ten to twelve days and take an extra millimeter of shortening.

In the event that there is an overcorrection—which I have had in two cases—the method of correction is by leaving off the glasses, and training the fusion faculty. In one case in which an error was made in setting the caliper by the inch scale instead of the metric, an overcorrection of 15 degrees was obtained. This was overcome by lengthening the muscle after the manner recommended by Bishop Harman.

I have found it important to get a tropometric reading in each case, as I have noted that in those cases in which there was a deficient movement of the eye outward there was usually a greater pull found when using the scales, and therefore I was forewarned to do a little more advancement.

I have used the Holzer-Priestly-Smith-tape method in measuring the degree of squint for near vision, and the tangent method for distance. It is all important to know what the average deviation is before sending the patient to the operating room, since carelessness in measurements would vitiate the ultimate result. As we must be accurate in the amount of advancement, even to 0.5 mm., so we must be exact, even to 1 degree in taking our measurements of the squint before we operate.

I had a small pair of calipers made. These are set beforehand to a certain number of millimeters, deter-

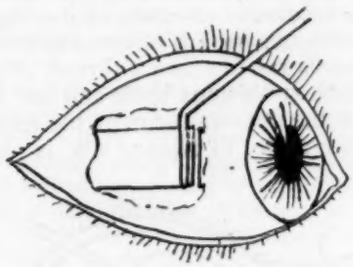


Fig. 5.—Exposure of external muscle, clamping with forceps, and cutting 1.5 mm. from insertion.

mined by the amount of deviation found in the case in which operation is to be performed. One arm of the calipers is rested on the forceps which hold the cut end of the muscle, and the other arm lies on the exposed muscle at the point where the suture is to be placed.

In order to have a firm hold that would not tear, the tendinous insertion of the muscle was used. That eliminated the scleral suture, which is admittedly dangerous at times and at times inefficient. By using this tendinous insertion we have a solid foundation to start with—an absolute necessity. Thus we have eliminated the two defects which have been our pitfalls in the past. We have accurate measurement and a firm hold on our advanced muscle; but to make ourselves doubly sure that healing will take place where we leave our advanced muscle—in order to make our accurate measurement worth while—I have devised a squint brace, which consists of a piece of lead plate which is anchored to the internal angle of the eye, the object of which is to stretch the internal rectus muscle, render the eye more or less immobile, and cause the eye to deviate from 12 to 18 degrees and thus take all tension off the advancement sutures and prevent any tearing or giving way of the sutures in the frail external rectus muscle.

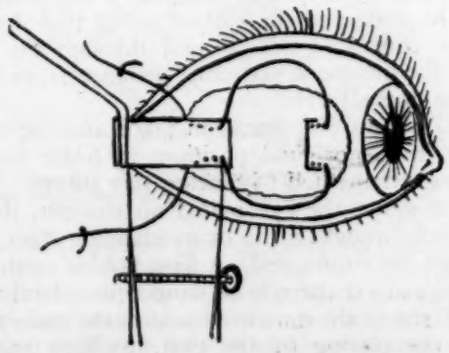


Fig. 6.—Cut external rectus laid back.

OPERATIVE PROCEDURE USED IN LAST SEVENTY-FIVE CASES

Figure 3 represents a strabismus brace which is to be anchored to the tendon of the internal rectus muscle. It consists of a semi-oval or shoe-heel shaped piece of flat lead, perforated in four places for the anchor sutures. Its dimensions are 14 mm. in its cross

diameter, 11 mm. in the horizontal diameter, and 0.5 mm. in thickness. Its purpose is to stretch the overacting internal rectus and to fix the eye so as to prevent tearing of the sutures in the advanced external rectus muscle.

Figure 4 shows the method of introduction and the position of the stay sutures for the strabismus brace. A slight opening about 3 mm. long is made at either border of the tendinous insertion of the internal rectus muscle; a strabismus hook is inserted under the tendon, and the tendon is raised; then a thread, *A B*, is passed along beside the strabismus hook and out through the conjunctiva at the opposite edge of the tendon. Thus, the first thread, a No. 14 twisted silk, is placed under-

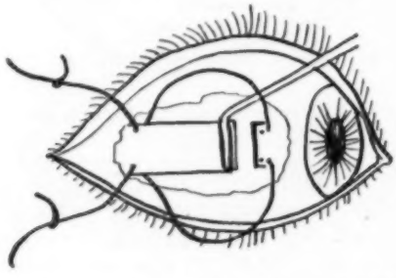


Fig. 7.—Thread in place and muscle held back in original position.

neath the tendon of the overacting internal rectus muscle; the second suture, a No. 8 twisted silk, is placed deep into the check ligament in the internal angle of the eye. These threads are now laid aside until after the resection of the external rectus has been completed, and then they are passed through the four perforations in the strabismus brace and tied.

Figure 5 represents the exposure of the external muscle, its clamping with muscle forceps, and the cutting of the muscle 1.5 mm. from its insertion.

Figure 6 presents the cut external rectus laid back; a double armed OO twenty day chromic catgut is first introduced from within outward, one needle going through the upper fourth of the tendinous stump and the other needle through the lower fourth of the stump. The upper thread is now passed from within outward through the upper fourth of the belly of the muscle at a distance measured by the caliper as herein shown, it having been previously determined how much shortening shall be done and the caliper set at that distance. The lower thread is now passed through the lower fourth of the muscle at the same distance from its cut end as the upper thread.

Figure 7 shows the thread in place and the muscle held back in the original position, in order to show better the exact method of placing this suture.

Figure 8 shows the eye pulled up straight, the end of the muscle brought up to or overlapping the corneal margin, and the suture tied. A firm hold is secured on the muscle, and yet there is no dangerous scleral stitch.

Figure 9 shows the muscle advanced, the main suture tied, and the placing of the two auxiliary modified Critchett sutures to guarantee no curling back of the cut ends of the muscle, and also to guard against an accidental untying of the first or main suture. I use here a No. 5 silk suture. These two sutures pass through the conjunctiva and the capsule, through the upper and lower edge of the muscle respectively, in front of the main suture, and then through the conjunctiva. The main suture of 00 catgut is now cut, and the muscle is also cut about 3 mm. in advance of the Critchett sutures. The latter sutures are now tied, thus closing the conjunctiva.

Figure 10 shows the external wound closed, and the brace tied in the internal angle of the eye by the two anchor sutures.

The eye is now closed and bandaged. Daily dressings of hot boric acid solution, atropin and argyrol are used. The brace and the auxiliary or Critchett stitches are removed on the eighth day. The patient is permitted to be up and dressed after thirty-six hours, and may go about after the third day.

COMMENT

A study of the seventy-five cases in which operation has been performed during the last two years suggests that:

1. It is necesary to operate on children sooner than has been our practice in order that we may aid nature in securing binocular vision at an age when binocular vision may be acquired.

2. We are able to straighten any case of squint at any age without doing a tenotomy or in any way cutting or interfering with the function of the internal rectus. A tenotomy of any grade is contraindicated in squint in young children.

3. In cases of deviation of 24 degrees or less it is sufficient to advance the external rectus in the squinting eye only. In cases of higher degrees of deviation it is advisable to advance the external rectus muscles of both eyes.

4. In young subjects with low degrees of deviation it requires about 3 mm. shortening to each 5 degrees of deviation; i. e., in a case of squint of say 15 degrees in a child under 10 years of age it would require about 9 mm. of shortening of the external rectus to secure an accurate and permanent effect. In a case of from 20 to 25 degrees of deviation, each 0.5 mm. will correct 1 degree of deviation. In older subjects, 0.5 mm. of shortening will approximately correct 1 degree of deviation. This holds good except in the very low degrees up to 12 or 14 degrees. The lower degrees require the ratio of 3 mm. of shortening to 5 degrees of deviation.

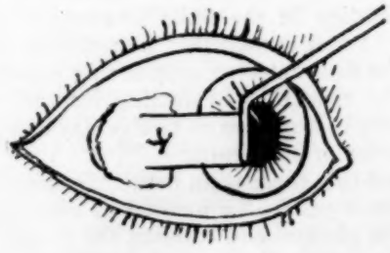


Fig. 8.—Eye pulled up straight, end of muscle brought up to or overlapping the corneal margin, and the suture tied.

In a few cases, I have shortened the external rectus 15 degrees and find that the ratio decreases; i. e., 15 mm. will correct from 30 to 35 degrees of deviation; however, I would advise against trying to advance a muscle so much because it is more difficult to do, and may restrict the movements of the eye, as well as produce some enophthalmos.

In cases with high degrees of deviation, say 40 degrees, it would require 10 mm. advancement of each external rectus. In cases as high as 50 degrees or more, the ratio increases; 12 mm. of advancement of each external rectus with the wearing of the brace ten

days will correct as much as from 50 to 55 degrees of deviation, whereas, 12 mm. of advancement on one eye only will certainly not correct more than 25 degrees of deviation. It seems that when both eyes are operated on at the same time, the ratio of correction is somewhat increased.

5. An overcorrection is necessary in order to secure a permanent result. The eye should deviate about 8 to 10 degrees after the stitches are out and the brace removed. This is an advantage, as it aids the fusion faculty to secure binocular vision as the previously crossed eye is assuming its permanent position.

6. The use of the caliper or some definite measuring device is essential to accurate work. The method of

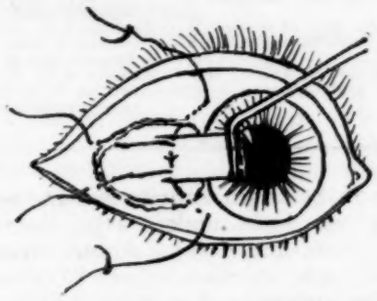


Fig. 9.—Muscle advanced, main suture tied, and two auxiliary modified Critchett sutures placed.

suturing through the stump avoids the dangerous scleral stitch and secures a firm anchorage, while the placing of the suture in the well dissected muscle enables one to measure with a degree of exactness greater than in any other method the amount of shortening produced. The importance of this can readily be understood when we see that it will enable us to operate on children under ether with the same confidence that we can on the grown subject under local anesthesia. It will enable us to operate on children before fixed habits are formed, anatomic changes in the muscles take place, blindness of the squinting eye occurs, and the possibility of fusion training is lost.

CONCLUSION

This new operation may have its faults, but I am sure it is a step in the right direction, and I hope it may help some more ingenious mind in perfecting a safe, sane and exact procedure which is so much needed in this most chaotic branch of surgery.

ABSTRACT OF DISCUSSION

DR. G. C. SAVAGE, Nashville, Tenn.: The brace Dr. Wilkinson presents stretches the internal rectus muscle, and that stretching kept up for a week or ten days certainly has a lasting effect. His work has shown that the internal rectus can never resume the power it had before the stretching. The stretching by means of this plate is similar to the stretching practiced by one of our European confrères before doing a complete tenotomy. I want to endorse the use of the suture brace as against a complete tenotomy. No internal or external rectus muscle; no superior or inferior rectus muscle should be cut in two, but in some cases of esohypertropia of each eye there is nothing to do effectively but to cut the inferior oblique entirely across. My criticism of the work my confrère is doing is that instead of cutting the external rectus muscle in two and then advancing it, he ought to do one or another of the operations known as shortening. Briggs' operation on the externus would be far better than an advancement operation, and my tucking operation would be still better, and some others almost as good. But the muscle should not be cut in two, either for the purpose of making it retract or for the purpose of bringing it farther forward on the eyeball. The danger is too great. That danger is minimized by the brace used by Dr. Wilkinson. Shortening will do everything that the most complicated advancement operation will do, and is far preferable. There is no question that demands study by the ophthalmologists of this country more than that of how to deal with the ocular muscles, not only in the tropias, but in the phorias as well. It pains me to see the slowness with which my confrères have taken hold of the task of mastering the study of ocular muscles.

DR. J. M. BANISTER, Omaha: I agree with Dr. Savage on one point—muscle shortening. I have used that method ever since 1898. I have never used the technical advancement operation except when I found that a muscle that had been operated on had lost control of the eyeball. Then I do the Reese operation. But with all respect to Dr. Savage, I want to say that in cases of strabismus I do not hesitate to do a tenotomy on the overacting muscle, simply separating the muscle from its attachment and not interfering with Tenon's capsule. I then take a tuck in the antagonist to secure greater effect. I have never seen anything but the happiest results.

DR. H. H. BRIGGS, Asheville, N. C.: Dr. Pannas of Paris introduced muscle stretching twenty-five years ago. In certain cases it still has a place. Dr. Wilkinson's splint serves the same purpose—it simply stretches the muscle. Like Dr. Savage, I seldom do a complete tenotomy; instead, I would shorten the opposing muscle, which could be done by my method of shortening as quickly as could the stretching. It would, moreover, be more rational than stretching in that it would tend to strengthen an impaired function rather than weaken the function of the muscle whose function ordinarily is not abnormal.

DR. JOHN GREEN, JR., St. Louis: Some of you may assume that a foreign body in contact with the conjunctiva may cause undue reaction. It certainly does not. There is no question that the brace holds the eye very definitely in divergence. I feel, therefore, that there is no contraindication, from a surgical point of view, to the temporary presence of this foreign body attached to the internal rectus.

DR. MEYER WIENER, St. Louis: I saw Dr. Wilkinson operate, and the use of this brace impressed me greatly. It certainly holds the eye in place and gives a chance for the wound to heal without any tension on the suture. I agree with most of the things Dr. Savage said, but I think there

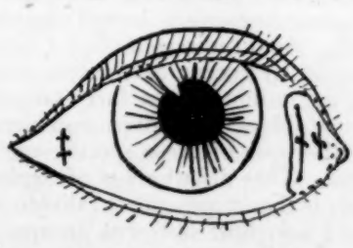


Fig. 10.—External wound closed, and brace tied in internal angle of eye by two anchor sutures.

are exceptions to every rule, especially his rule about making a section of the internal or external rectus muscle. I do not believe it should be done unless it is necessary, but it can be done without any harm. In cases of convergence of less than 30 degrees I do an advancement operation without section of the opposing muscle; in cases of convergent squint of more than 30 degrees, unless I want to advance both muscles, or section the opposing one, I cannot get the desired result. Very few people will submit to two operations, so I do a section of the opposing muscle. It makes a tremendous difference how that section is made. If one makes a very small opening in the capsule of Tenon, the muscle will not slip back. It is only when you cut around the capsule of Tenon and disturb the fat of the orbit that you get bad results, with an ugly sinking of the caruncle.

DR. ELDRED B. CAYCE, Nashville, Tenn.: I assisted Dr. Wilkinson at an operation and the results were ideal. The patient has binocular vision.

DR. OSCAR WILKINSON, Washington, D. C.: Dr. Savage said that we should do some form of shortening or tucking. What we should do is to try to arrive at something definite as to what we are doing. Dr. Savage can straighten crossed eyes by tucking; but when you do it, you do not get the same results. If we could get some method by which we can be more accurate. I think we can teach young men so they will get better results in squint. If one does not operate before the patient is 10 years of age he seldom gets binocular vision. I think it is our duty to devise some means of operating on children before they are that old. Dr. Savage spoke of the danger. I have had seventy-five cases, and in not a single case have I had any reason to regret using the brace. Advancement operations have not been satisfactory, and in the tucking operation the trouble is that one cannot accurately measure how much he has tucked up. It is the element of uncertainty as to what one is doing. There is the same uncertainty about a tenotomy. No man can tell what effect he is going to get with a tenotomy. But when we do get an accurate method we will in time bring this squint surgery out of the chaotic state in which it is today. The men of this country have an idea that it is necessary to do something with the internal rectus muscle. My idea is that, if we leave the internal rectus muscle alone and work with the external muscle, eventually we will arrive at something definite in squint surgery.

THE RACIAL DISTRIBUTION OF ISOHEMAGGLUTININ GROUPS *

JULIAN H. LEWIS, M.D.
AND
DEBORAH L. HENDERSON, B.S.
CHICAGO

According to our present understanding of human isohemagglutinins, there exist in the blood two types of specific agglutinating substances, which may be designated a and b. In the red cells there are two specific types of agglutininogenic substances, which may be called A and B. The agglutinin of Type a will agglutinate only cells containing the agglutininogenic substance A, and Agglutinin b will agglutinate only cells containing Agglutininogen B. Obviously, one type of agglutinin will occur only in the absence of its corresponding agglutininogen, a fact utilized in classifying samples of blood. A given specimen of blood may contain either one of these specific agglutinins, or both, or neither. This distribution of agglutinins and agglutininogens makes it possible to divide all samples of human blood into four different groups.

One group contains both types of specific agglutininogens, but the serum contains no agglutinins. A second group contains Agglutinin b and Agglutininogen A. A third group contains Agglutinin a and Agglutininogen B. A fourth group contains neither agglutinin but contains both agglutininogens. There have been various designations of these four groups but, because of the resulting confusion and the accidents that occurred in the practical application of blood grouping to transfusion, the American Association of Pathologists and Bacteriologists and the American Association of Immunologists have adopted officially the classification as proposed by Jansky,[1] because of its logic and priority. The groupings that have been proposed by von Dungern and Hirschfeld[2] and by Moss[3] differ from that of Jansky only in terminology. The first of the foregoing groups is called Group I; the second, Group II; the third, Group III, and the fourth Group IV. This is also the numerical order in which they occur in human bloods. The Jansky grouping is presented schematically in Table 1.[4]

TABLE 1.—JANSKY BLOOD GROUPING

Group	Effect of Serum on Other Groups	Effect of Other Groups on Cells
I	Agglutinates cells of the three other groups; contains Agglutinins a and b	Inagglutinatable; contains no agglutininogen
II	Agglutinates cells of Groups III and IV; contains Agglutinin b	Agglutinated by serum of Groups I and III; contains Agglutininogen A
III	Agglutinates cells of Groups II and IV; contains Agglutinin a	Agglutinated by serum of Groups I and II; contains Agglutinogen B
IV	No agglutinative effect; contains no agglutinins	Agglutinated by serum of Groups I, II and III; contains Agglutininogens A and B

The study of the origin, distribution and significance of these as yet little understood substances will undoubtedly prove interesting. According to H. and L. Hirschfeld,[5] who examined about 8,000 samples of blood from the various races assembled in Europe during the recent war, the distribution of the four groups of hemagglutinins among these people varied extremely, but certain races could be grouped together because of the similarity in the distribution among them of the specific agglutinins a and b. This grouping of races corresponded somewhat to the grouping made on an anthropologic basis; it corresponded still more completely to the geographic distribution of the races. It was found that the European type, including Englishmen, Frenchmen, Italians, Germans, Austrians, Bulgarians, Serbians and Greeks, is characterized by the prevalence of Group II of the hemagglutinins and a low incidence of Group III. Among the Asio-African group, including Malagasies, Negroes, Anameses and Hindus, the incidence of Group II is low, while that of Group III is high. There is an intermediate type including Turks, Arabs, Russians and Jews, in which the two groups occur intermediate to that of the European and Asio-African types. The proportion of the prevalence of Agglutinin a and Agglutinin b in each race is expressed numerically as a biochemical race index. The race index for the European peoples varies between 4.5 and 2.5; for the Asio-African peoples it is 1 or less, while the intermediate type is characterized by a race index of from 1 to 2.

This is an important contribution to anthropologic methods because it is a characteristic with a biochemical basis and is therefore definite and susceptible of accurate study. Some of the uses that the method may serve are pointed out by the Hirschfelds. They seem to find evidence in their work that suggests two sources of origin of the human race, one in India, where Agglutinin a arose, and the other in western or central Europe, where Agglutinin b had its origin. It is believed that further examination of the northern races will lead to definite conclusions as to this view. The relations of races as indicated by the hemagglutinins are in some instances inconsistent with those previously

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4. Ottenberg, Reuben: J. Immunol. **6**: 363 (Sept.) 1921.
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established by the usual methods of anthropology. For instance, Russians and Jews, who differ so much from each other in anatomic characteristics, mode of life, occupation and temperament, and because of this have been thought to be in different anthropologic groups, have exactly the same proportions of Groups II and III, their race index being 1.3. The Hindus, who are considered anthropologically near the Europeans, show the greatest difference from them in blood properties. The race index of the Hindus is 0.5, compared with 4.5 of the English and 2.5 of the Greeks, the highest and the lowest of the European race indexes. It more nearly approximates the index of the Negro and Anamese, 0.8, to whom the Hindus have a resemblance in skin pigmentation.

Prichard [6] defines a race as a collection of individuals representing more or less common features transmissible by heredity. Isohemagglutinins, the distribution of which characterizes a race, seem to be a biologic character that is inherited in true mendelian fashion. Von Dungern and Hirschfeld [7] first showed this to be true, and their findings have been amply confirmed by Ottenberg.[8] A given kind of specific agglutinin or agglutininogen never occurs in a child unless it is present in one of the parents, and when one of these substances is present in both parents it occurs in most of the children. When one of the substances occurs in only one parent, some of the children inherit it, and when neither parent has one of the substances no child ever shows it. This fact would seem to indicate that the findings of the Hirschfelds are not accidental but are true racial characteristics, the perpetuity of which is insured. Verzar and Weszeczky [9] found that several races (Germans, Slavs and Gypsies), living side by side in Hungary for several centuries but without intermingling, have retained their characteristic blood group distribution, it being identical with the distribution among the same races in other countries.

What happens on the intermixture of two races with different distributions of hemagglutinins has not been studied. Anthropologists, with their more established methods, are able to detect the derivation of races by isolating in them the characteristics which are known to belong to pure races. It might also be possible to determine the components of a given race from the study of the distribution of the hemagglutinin groups. As a prerequisite, one would desire to examine a mixed race, of which the constituents, as well as the distribution of hemagglutinins among these constituents, are known. Such an opportunity presents itself in America, where there has been a widespread intermixture of Negroes and Caucasians, both of whose biochemical indexes are known. The amount of such intermixture is difficult to estimate, but it is unusual to find an individual of African descent who does not show, or give a history of, intermixture with the Caucasian race.

As pointed out by Reuter,[10] the inheritance of Negro characteristics in Negro-white crosses overwhelms, and to a great extent obscures, many of the inherited white characteristics. Some years ago Dubois [11] estimated that one third of the American Negroes had some white blood. Because of the obscured intermixture and because of the constant increase, it is very probable that the present figure is greater than that given by Dubois. It would seem, then, of interest and of some possible importance to study the effect, on the distribution of hemagglutinins, of the intermixture of these two races which are anthropologically different and among which the hemagglutinin groups occur with such wide difference.

Blood samples from 270 Negroes were examined, and the group number for each determined. At first an attempt was made in each case to estimate the amount of white intermixture from the characters which are supposed to vary with the degree of intermixture, such as pigmentation, texture of hair and features. It was soon found that this was impossible, as these characters did not vary equally and quantitatively.

As among other groups of people, Group I of the hemagglutinins predominated. Forty-nine per cent. were found to belong to this group, which is larger than that found for other races. Group IV was the smallest, 5.53 per cent.; 26.9 per cent. belonged to Group II, and 18.4 per cent. to Group III. Table 2 presents the results in tabular form, for comparison with the results of other investigators.

TABLE 2.—BLOOD GROUPS IN THE NEGRO AND WHITE RACES

Investigator	Locality	Race	Number Examined	Groups I %	II %	III %	IV %
Hektoen *	Chicago	White	76	47	34	10	9
Moss [2]	Baltimore	White	100	43	40	7	10
H. and L. Hirschfeld [5]	England	White	500	46.4	43.4	7.2	3
H. and L. Hirschfeld	Africa	Negro	500	43.2	22.6	29.2	5
Lewis and Henderson	United States	Negro	270	49	26.9	18.4	5.5

* Hektoen, Ludvig: J. Infect. Dis. 4: 297, 1907.

Table 2 shows that the percentage of Group II in American Negroes is much lower than in white persons, while Group III is much larger in the Negro. This finding, though approximating the findings of the Hirschfelds for African Negroes, differs from them in that the Group II figure is higher and the Group III figure is lower. In other words, the percentages of these two groups tend to approach those for white persons.

The Hirschfelds use, as the race index, the relation of the percentage of Agglutinin b (Groups II and IV) to the percentage of Agglutinin a (Groups III and IV). The index for African Negroes is 0.8. The index for American Negroes, as calculated from our results, is 1.4.

As no other factor is known which may change the distribution of hemagglutinin groups among a race, it is probable that the change that has been observed for negroes is the result of intermixture with the white race. It is all the more probable because the change in figures has been in the direction toward the figures for the white persons.

CONCLUSIONS

1. The distribution of isohemagglutinin Groups II and III among American Negroes is very different from that among the white race.

2. It approximates the distribution of hemagglutinin groups among African Negroes, but differs from the latter in an increase of the percentage of Group II and a decrease of the percentage of Group III.

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3. Since the difference in the distribution of hemagglutinin groups among African and American Negroes lies in the direction of an approach to the distribution among the white race, it is assumed that the change is due to intermixture with the latter.

THE USE OF VEGETABLES IN THE DIABETIC DIET *

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Although different points of view are held on the subject of the dietary treatment of diabetes, all clinicians agree that there must be some regulation of carbohydrate intake. When the amount of carbohydrate allowed is small, the diet becomes restricted to comparatively few foods. In response to the need for foods low in carbohydrate, a great variety of so-called diabetic foods have appeared on the market, many of which contain large amounts of protein and fat, with varying amounts of carbohydrate. All of these foods are relatively expensive.[1] Even those low in carbohydrate are generally concentrated foods and greatly increase the amounts of the other food constituents in the diet. As Janney [2] has shown, from one half to three fourths of the protein may be converted to sugar in the diabetic organism, and consequently protein-rich diabetic foods indirectly increase the sugar in the diet, even though the foods may be carbohydrate free. For this reason there are times when it is desirable to restrict the diet generally, as well as the carbohydrate.

Among the most useful articles in the diabetic diet are those which contain little food value and especially little carbohydrate, since they help to allay hunger without exceeding the tolerance of the patient. Green vegetables fulfil these requirements well, since many of them are low in protein and carbohydrate and contain a negligible amount of fat; some of these are of value even in the raw state for patients with severe diabetes. Orton [3] has recently described a large number of vegetables which are suitable for diabetic patients and which are not commonly available to a large number of people. The added palatability given to a diabetic diet by such a variety of unusual vegetables is of sufficient importance to warrant their production in larger quantities.

It is generally accepted that some of the fuel value of vegetables is lost in cooking, although actual experimental data are not abundant. Joslin [4] compiled a table from various sources giving comparisons of certain fresh and cooked vegetables from the standpoint of carbohydrate content. From an inspection of this table one may conclude that cooked vegetables contain about two thirds of the carbohydrate present in the fresh state. Masters and Garbutt [5] and Denton [6] showed that greater loss of fuel value occurs in vegetables when they are cut into small pieces and when the time of boiling and the volume of boiling water are increased.

Allen,[7] in 1915, first advocated the "thrice boiling" of vegetables, in which, by changing the water twice during boiling, the carbohydrate was assumed to be removed more completely. Vegetables so prepared are now commonly used in the diets of diabetics with good results. However, only recently has any experimental evidence been produced as to the actual carbohydrate content of these thrice boiled vegetables. Wardall [8] has shown that increasing the number of extractions of certain vegetables with water aids in the complete-

TABLE 1.—CARBOHYDRATE CONTENT OF THRICE BOILED VEGETABLES

Vegetable	Ratio of Amount of Vegetable to Total Boiling Water	Total Available Carbohydrate (in Terms of Glucose), per Cent.	Recorded Total Carbohydrate Minus Fiber (Raw),* per Cent.
Canned spinach [12]	1:30	0.31	1.7
	1:60	0.20	
Fresh spinach [10]	L. E.†	0.00	2.3
Celery [10]	L. E.	0.00	2.0‡
Celery [12]	1:30	0.07	
	1:60	0.00	
Celery [14]	1:14.9	0.65	
Lettuce [12]	1:30	0.03	2.2
	1:60	0.00	
Canned asparagus [12]	1:30	0.24	2.3
	1:60	0.20	
Asparagus (total sugar):			
Thrice boiled [9]	1:6	0.18	2.5
Extracted at 60 C.[9]	1:22	0.13	
Rhubarb (total sugar):			
Thrice boiled [9]	1:6	0.05	2.5
Extracted at 60 C.[9]	1:6	0.08	
Rhubarb [10]	L. E.	0.00	
Vegetable marrow [12]	1:30	0.22	2.6
	1:60	0.00	
Brussels sprouts [12]	1:30	0.72	2.9
	1:60	1.31	
Sprouts [10]	L. E.	0.00	4.5‡
Canned string beans [12]	1:30	0.49	3.3
	1:60	0.41	
Cauliflower [12]	1:30	0.79	3.7
	1:60	0.51	
Cauliflower [11]	1:6	0.80	
Cauliflower [14]	1:8.3	0.56	
	1:5.4	0.79	
Cauliflower [10]—Stalk	L. E.	0.40	
Flower	L. E.	0.80	
Seakale [10]	L. E.	0.60	4.0‡
Pumpkin [12]	1:30	0.29	4.0
	1:60	0.41	
Cabbage [12]	1:30	0.45	4.5
	1:60	0.51	
Cabbage [13]	1:6	0.50	
Cabbage [14]	1:8.1	0.83	
Cabbage [10]	L. E.	0.50	
Chinese cabbage (total sugar):			
Thrice boiled [9]	1:6	0.11	
Extracted at 60 C.[9]	L. E.	0.05	
Swede [10]	L. E.	1.00	6.5‡
Turnip [10]	L. E.	0.00	6.8
Turnip [12]	1:30	0.72	
	1:60	0.20	
Squash [12]	1:30	6.90	8.2
	1:60	4.74	
Squash [14] (total sugar)	1:2.6	2.66	
Carrots [12]	1:30	0.60	8.2
	1:60	0.55	
Carrots [14]	1:5	0.79	
Carrots [10]	L. E.	0.00	
Carrots [8] (extracted at 60 C.)	1:15	0.70	
Canned green peas [12]	1:30	7.70	8.6
	1:60	3.10	
Beets [12]	1:30	1.17	8.8
	1:60	0.20	
Beets [10]	L. E.	0.40	
Onions [10]	L. E.	0.10	9.1
Onions [12]	1:30	0.52	
	1:60	0.14	
Parsnips [12]	1:30	6.53	11.0
	1:60	2.49	
Parsnips [10]	L. E.	0.60	
Artichoke [10]	L. E.	1.00	15.9
Potato [10]	L. E.	1.00	18.0

* Values from Atwater, W. O., and Bryant, A. P.: Chemical Composition of American Food Materials, Bull. 28, U. S. Dept. Agric., revised, 1906.
† L. E. indicates the use of a large excess of water.
‡ Values from Cammidge (Lancet 2:1192 [Dec. 27] 1919).

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ness of removal of the carbohydrate. She has further recommended a modification of this process in which the vegetables are extracted at 60 C. for periods of from ten to fifteen minutes, repeating the extraction until the reducing substances are practically removed.

TABLE 2.—DIETARY 1 FOR PERSONS WITH SEVERE DIABETES

Food	Amount		Protein,	Fat,	Carbohydrate,
Breakfast:	Gm. or C.c.	Oz.	Gm.	Gm.	Gm.
Thrice boiled rhubarb	100	3.5	0.6	0.7	0.05
Thrice boiled asparagus	100	3.5	1.8	0.2	0.18
Eggs, 2	...	...	13.2	12.0	0.0
Cocoa, 1 cup	225	8.0			
Cream, 1 tablespoonful	15	0.5	0.7	5.1	0.7
Cocoa	4	0.1	0.8	1.1	1.4
Saccharin, ½ grain	1/30				
Water, ¾ cup	170	6.0			
Total for breakfast			17.1	19.1	2.3
Dinner:					
Skimmed chicken broth, 1 cup	225	8.0	1.2	0.1	0.0
Scraped beef balls	100	3.5	20.9	10.6	0.0
Butter	10	0.3	0.1	8.5	0.0
Canned tomato	100	3.5	1.2	0.2	3.5
Thrice boiled spinach	100	3.5	2.1	0.3	0.3
Thrice boiled cabbage	100	3.5	0.6	0.1	0.5
Lemon gelatin, ½ cup					
Gelatin, 1 teaspoonful	2.5	0.1	2.3	0.0	0.0
Lemon juice, 1 tablespoonful	15	0.5	0.0	0.0	1.3
Saccharin, ½ grain	1/30				
Water, ½ cup	113	4.0			
Total for dinner			28.4	19.8	5.6
Supper:					
Skimmed beef broth, 1 cup	225	8.0	2.4	0.1	0.0
White meat of chicken	50	1.7	16.1	2.2	0.0
Thrice boiled string beans	100	3.5	0.8	0.3	0.5
Thrice boiled carrots	100	3.5	0.5	0.2	0.6
Butter	10	0.3	0.1	8.5	0.0
Celery, raw	25	0.9	0.2	0.0	0.5
Lettuce, fresh	25	0.9	0.3	0.1	0.5
Total for supper			20.4	11.4	2.1
Total for day, 756 calories			65.9	50.3	10.0

Beets and parsnips were made practically sugar free in one hour by this method, carrots required one and one-half hours, egg plant two hours and pineapple three and one-half hours, while cabbage was little affected. Wardall found that the color, texture and palatibility of vegetables are less impaired by this procedure than by repeated boiling. Bailey[9] showed that by repeated extraction of rhubarb, asparagus and Chinese cabbage with water at 60 C., and at the boiling point, there was a very marked decrease in reducing sugars, and a less conspicuous decrease in other nitrogen-free extract. Protein was not substantially changed, but there was considerable loss of mineral matter. Cammidge[10] was able to remove all of the carbohydrate by thrice boiling celery, rhubarb, spinach, turnips and carrots in a large excess of water, while small amounts were retained in the other vegetables studied. Olmsted[11] showed that there was about 0.5 per cent. available carbohydrate in thrice boiled cabbage and 0.8 per cent. in thrice boiled cauliflower, representing about 10 and 24 per cent., respectively, of the carbohydrate of the raw vegetables. O'Reilly and McCabe[12] have shown that if the volume of boiling water is sufficient (in each extraction 20 parts of water to 1 of vegetable), thrice boiling removes the carbohydrate completely from vegetable marrow, lettuce and celery, and approximately from canned spinach, canned asparagus, turnips, beets and onions. Canned string beans, cauliflower, pumpkin, cabbage and carrots still retain about 0.5 per cent. of available carbohydrate.

9. Bailey, E. M.: Diabetic Foods, Conn. Agric. Exp. Stat. Bull. 220, **2**: 293, 1920.
10. Cammidge, P. J.: Lancet **2**: 1192 (Dec. 27) 1919.
11. Olmsted, W. H.: J. Biol. Chem. **41**: 45 (Jan.) 1920.
12. O'Reilly, L., and McCabe, E. H.: J. Biol. Chem. **46**: 83 (March) 1921.

Studies[13] on the carbohydrate content of various foods have been in progress in this laboratory for several years. In a paper by Myers and Croll,[14] a relatively simple method was described for the determination of soluble reducing and nonreducing sugars and total available carbohydrate in vegetables and fruits. By the use of this method and by comparison with recorded values, we showed that a large proportion of the available carbohydrate of some fruits and vegetables appears to be in the form of soluble sugars. This leads to the inference that it should be possible to remove a very large percentage of the carbohydrate in the boiling process. It was shown that the ordinary method of boiling vegetables for a minimum time and with a small amount of water removed from 23 to 66 per cent. of the carbohydrate, while from 62 to 88 per cent. was lost in thrice boiling when the proportion of "boiling water" to vegetable was relatively large. It was concluded that the soluble form of much of the carbohydrate, and the increase in time of boiling and especially in volume of boiling water, favor the removal of carbohydrate from vegetables.

Since it has been shown (Table 1) by various investigators that most of the available carbohydrate can be removed by proper regulation of conditions in boiling certain vegetables, the amount of such vegetables commonly considered suitable for the diabetic may be increased, and the introduction into the diet of vegetables containing in the raw form higher percentages of carbohydrate may be made with safety.

TABLE 3.—DIETARY 2 FOR PATIENTS WITH SEVERE DIABETES

Food	Amount		Protein,	Fat,	Carbohydrate,
Breakfast:	Gm. or C.c.	Oz.	Gm.	Gm.	Gm.
Grapefruit	100	3.5	0.8	0.2	10.0
Egg, 1	...	...	6.6	6.0	0.0
Bran muffin,* 1 small	...	...	2.3	2.6	2.2
Butter	10	0.3	0.1	8.5	0.0
Coffee, clear					
Total for breakfast			9.8	17.3	12.2
Lunch:					
Skimmed beef broth, 1 cup	225	8.0	2.4	0.1	0.0
Codfish, cooked	100	3.5	21.7	0.3	1.6
Thrice boiled beets	100	3.5	2.3	0.1	1.0
Thrice boiled brussels sprouts	50	1.7	0.7	0.1	0.4
Butter	15	0.5	0.1	12.7	0.0
Bran muffin, 1 small	...	...	2.3	2.6	2.2
Tea, clear					
Salad					
Egg, hard boiled, 1	...	...	6.6	6.0	0.0
Lettuce	25	0.9	0.3	0.1	0.5
Total for lunch			36.4	22.0	5.7
Dinner:					
Skimmed chicken broth, 1 cup	225	8.0	1.2	0.1	0.0
Roast lamb (lean)	75	2.6	14.8	9.5	0.0
Thrice boiled onions	100	3.5	1.2	1.8	0.5
Thrice boiled cauliflower	100	3.5	0.9	0.1	0.7
Thrice boiled turnips	100	3.5	0.3	0.1	0.7
Bran muffins, 2 small	...	...	4.6	5.3	4.5
Butter	20	0.7	0.2	17.0	0.0
Salad					
Lettuce	25	0.9	0.3	0.1	0.5
Raw tomato	100	3.5	1.2	0.2	4.0
Tea, clear					
Coffee gelatin, ½ cup					
Gelatin, 1 teaspoonful	2.5	0.1	2.3	0.0	0.0
Strong coffee, clear, 1 tablespoonful	15	0.5			
Saccharin, ½ grain	1/30				
Water, ½ cup	113	4.0			
Total for dinner			27.0	34.2	10.9
Total for day, 1,073 calories			73.0	74.0	28.8

* Recipe for diabetic bran muffins: 2 cupfuls of washed bran, ½ grain of saccharin, 2 eggs, ½ teaspoonful salt and 1 tablespoonful of butter or cooking oil. This is sufficient for twelve small muffins.

13. Bernhard, A.: Sugar **17**: 41, 1915. Myers, V. C., and Rose, A. R.: The Nutritional Value of the Banana, J. A. M. A. **68**: 1022 (April 7) 1917. Rose, A. R.: J. Biol. Chem. **46**: 529 (May) 1921.
14. Myers, V. C., and Croll, H. M.: J. Biol. Chem. **46**: 537 (May) 1921.

Evidence has been presented by several investigators[15] to show that the water soluble vitamin in certain vegetables is not destroyed by the ordinary household method of boiling the vegetables for from thirty to sixty minutes, but that from 35 to 70 per cent. of the vitamin may be lost in the boiling water. The soluble mineral constituents of vegetables are likewise extracted in variable amounts in the boiling process.[5] It is to be presumed that large amounts of these water soluble constituents are removed by thrice boiling; consequently, small amounts of fresh fruits and vegetables containing mineral salts and accessory substances should be included in a diet depending largely on thrice boiled vegetables for bulk and variety.

The flavor of thrice boiled vegetables may be improved by the use of suitable seasonings, and by the combination of several vegetables into salads or other dishes. From the purely medical standpoint, this factor of palatability and variety in the diet should not be overlooked, since the success of the dietetic treatment of diabetes depends largely on the willingness and ability of the patient to keep within the food limits set by the physician.

Two dietaries for severe diabetics are shown to illustrate the variety such addition of vegetables gives to the diet, and to show the practical value of knowing the carbohydrate content of vegetables used. The values for carbohydrate in thrice boiled vegetables are taken from Table 1, which is a compilation of available data on thrice boiled vegetables. The figures selected are generally the highest values recorded, since some of the lowest values were obtained by using very large amounts of water in boiling, larger than might be practicable in the household. Obviously, if complete extraction of the carbohydrate is accomplished by having sufficient water, a larger amount of vegetable may be used in the diet. Values for other constituents were taken from Locke.[16]

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Clinical Notes, Suggestions, and New Instruments

A SIMPLE METHOD FOR ADMINISTRATION OF IODIDS IN THE FOOD IN GOITROUS REGIONS*

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Simple goiter is endemic throughout those parts of the United States which are not close to the eastern or western seaboard. It is most prevalent in those regions which are poorest in iodin. The literature on this subject and the distribution of goiter in this country have been reviewed recently by McClendon[1] and by Hayhurst.[2] David Marine[3] has demonstrated conclusively that the development of endemic simple goiter is closely associated with lack of iodin in the food, and that its occurrence can be prevented by the routine administration of iodids.

Marine administered 2.0 gm. of sodium iodid in ten 0.2 gm. daily doses twice a year to more than 2,000 schoolchildren in Akron, Ohio, and found that after this treatment, new enlargements of the thyroid never developed, and, on the other hand, that 38 per cent. of the thyroids which were already enlarged decreased in size.

In the goitrous regions of Switzerland a similar campaign has been carried out during recent years, by various methods of administration, the most satisfactory of which is the giving of iodids in chocolate bonbons once a week. As little as 0.15 gm. of iodids given in the course of a year sufficed to prevent the development of goiter, according to Bayard,[4] Baumann[5] and Klinger.[6]

METHOD OF ADMINISTRATION

Since the lack of iodids is really a food deficiency, in certain respects similar to a lack of vitamins, it would appear that the simplest and, certainly, the easiest method is to supply this deficiency along with the food itself, particularly since Plummer[7] has demonstrated that the body requires only minute quantities amounting to about 1 mg. of iodin a day.

The most convenient method for the administration of small quantities of iodid continuously over a long period of time is to add it to the table salt. This does not alter the taste of the salt in the least, and therefore does not carry with it the opprobrium of a "medicine" to the patient; moreover, the easier the method of administration of such a substance the greater the probability of its extended use.

A simple method for household use is this: A stock of sodium chlorid to which 1 per cent. of potassium iodid has been added, "iodized salt," is kept on hand and is sprinkled over the ordinary table salt with an ordinary salt shaker.

This may be used either for iodizing all the salt used both for cooking and at the table, or for the salt used at the table only. In the latter case, on the assumption that from one fourth to one third of the salt ingested is used from the table shakers, the table salt should contain four times as much iodid for each pound as the salt which is used for both cooking and table purposes.

DIRECTIONS FOR ORDINARY USE IN ALL THE SALT USED FOR COOKING AND TABLE SALT

The contents of a 5-pound bag of salt are spread on a flat tray or clean table in a thin layer. A salt shaker is emptied. Five teaspoonfuls of the iodized salt is poured into it. The lid of the shaker is put on, and the iodized salt is sprinkled evenly over all parts of the salt spread out on the tray until all the salt in the shaker is used. The salt that has been sprinkled is put into a big bowl, stirred with a spoon to mix thoroughly, and kept for all the uses of the family. This will furnish just as much iodin as the body requires.

To use in table shakers only when iodized salt is not put into the cooking salt, the same thing is done as for the cooking salt, but 2 tablespoonfuls of iodized salt is used to sprinkle over each pound (two large cupfuls) of common salt used, or half a tumblerful for a 5-pound sack, and then this quantity of the iodized salt is sprinkled over the ordinary salt.

The stock of "1 per cent. iodized salt" may be prepared by a pharmacist, or an intelligent housewife may purchase the 10 per cent. potassium iodid solution and prepare it herself.

PREPARATION OF THE STOCK "IODIZED SALT" CONTAINING ONE PER CENT. POTASSIUM IODID

A pound of ordinary salt is spread out in a large evaporating dish or enamel pan, and 50 c.c. of a 10 per cent. solution of potassium iodid in 60 per cent. alcohol is slowly sprinkled diffusely over it, from a pipet, or, still better, sprayed on from an atomizer spray, so as to be distributed as evenly as possible over the salt. It is then stirred well with a spoon, dried by evaporation over a water bath, and ground up in a mortar or crushed to a powder with a large spoon.

If the stock of 1 per cent. iodized salt is prepared in the home, it can be dried by leaving the pan on the top of the oven until the salt is about dry, and then heating gently over

* From the Department of Pharmacology, University of Minnesota.

1. McClendon, J. F.: Are Iodides Food? Science **15**: 358, 1922.

2. Hayhurst, E. R.: The Present-Day Sources of Common Salt in Relation to Health, and Especially to Iodin Scarcity and Goiter, J. A. M. A. **78**: 18 (Jan. 7) 1922.

3. Marine, David, and Kimball, O. P.: Prevention of Goiter in Man, I, J. Lab. & Clin. Med. **3**: 40 (Oct.) 1917; II, Arch. Int. Med. **22**: 41 (July 18) 1918. Kimball, O. P.; Rogoff, J. M., and Marine, David: III, J. A. M. A. **73**: 1873 (Dec. 20) 1919.

4. Bayard: Beiträge zur Schilddrüsenfrage, Basel, 1919.

5. Baumann, Erwin: Zur Prophylaxe und Therapie des Kropfes, Schweiz. med. Wchnschr. **52**: 280 (March 16) 1922.

6. Klinger, R.: Die Prophylaxe des endemischen Kropfes, Schweiz. med. Wchnschr. **51**: 12 (Jan. 6) 1921.

7. Plummer, H. S.: Interrelationship of Function of the Thyroid Gland, and of Its Active Agent, Thyroxin, in the Tissues of the Body, J. A. M. A. **77**: 243 (July 23) 1921.

a small flame until perfect dryness is attained. It is then crushed to a powder.

CONCLUSION

The use of the method described will facilitate the prophylaxis of simple goiter and, occasionally, the therapy of very early cases.

A CASE OF BRAIN ABSCESS OF UNUSUAL ETIOLOGY *

SAMUEL SILBERT, M.D., NEW YORK

Brain abscess usually results from one of three causes: (1) chronic purulent otitis media; (2) fracture of the skull, with or without external injury, and (3) abscesses of metastatic origin. The occurrence in civil life of a brain abscess resulting from direct introduction into the brain of an infected foreign body is sufficiently unusual to warrant publication. Furthermore, had the possible serious sequelae of the injury in this case been borne in mind, the presence of an abscess might have been suspected, and the child's life saved by a timely operation.

REPORT OF CASE

History.—A boy, aged 6 years, who had always been in good health, had stumbled and fallen, six weeks before admission, on a stick which he was carrying, causing a small wound on the left side of the face which bled profusely. This wound became infected and discharged considerable pus, but healed firmly in about eight days. The boy then seemed perfectly well and was taken to the country. Four weeks before admission, the child began to complain of headache and seemed a little feverish from time to time. He was taken to a physician, who considered it a gastro-intestinal case and prescribed cathartics and enemas. The headaches continued in spite of the treatment, but the child did not complain of feeling ill and played with the other children. Three days before admission, the headache became so severe and the fever so high, that the boy was put to bed. He did not vomit and had no convulsions. His condition became rapidly worse; he became delirious, and was brought into the hospital in a moribund state.

Physical Examination.—The boy was very sick with high fever and delirium. He muttered about severe headache and was very restless, with the head retracted and marked opisthotonos. The eyes showed no ptosis or palsies. The right pupil was larger than the left; both reacted sluggishly to light. There was marked stiffness of the neck. The lungs showed dulness, bronchial breathing and crepitant râles over the left upper lobe. There was a marked bilateral Kernig sign, and the deep reflexes were exaggerated.

Course.—The admission diagnosis was pneumonia, with pneumococcus meningitis. A lumbar puncture was made; 25 c.c. of purulent fluid under moderately increased pressure was removed and 20 c.c. of antimeningococcus serum given. A gram-positive diplococcus was reported in the fluid. The condition of the child became rapidly worse, and he died about half an hour after admission to the hospital.

Necropsy.—There was a small wound about 1 cm. in length and firmly healed on the left side of the face midway between the outer angle of the orbit and the external auditory meatus. On removal of the skull cap and reflection of the dura, the surface of the brain was found to be covered with thick purulent exudate. The left temporal lobe showed marked flattening of the gyri, and, on palpation, fluctuation was obtained. Section through this area revealed a large abscess cavity filled with thick purulent material. The dura overlying the abscess had a perforation less than 1 cm. in diameter, and a probe introduced into this opening led directly through a similar perforation in the squamous portion of the temporal bone to an abscess under the temporal muscle. The perforation through the bone was the site of a localized osteomyelitis, and from the tract two wooden splinters were recovered. The subtemporal abscess lay directly beneath the healed wound on the left side of the face. Microscopic examination revealed a dense purulent infiltration of the meninges. The organism was a staphylococcus.

Both pleural cavities contained about 100 c.c. of straw-colored fluid. The lungs were voluminous, and, on section, showed marked edema and congestion. No gross abnormality was found in the heart. The liver and kidneys showed marked passive congestion. The spleen was somewhat enlarged, and there was moderate increase in pulp tissue.

The anatomic diagnosis was acute purulent meningitis, brain abscess (left temporal lobe) and acute bronchopneumonia.

COMMENT

It is interesting to note that in spite of the presence of an abscess underlying the wound, complete healing took place. Had the diagnosis of brain abscess been made while the condition of the child was good, the healed wound would have exactly indicated the point for surgical approach. Drainage at this point could have been easily accomplished and complete recovery might have taken place.

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New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION. W. A. PUCKNER, SECRETARY.

HAY FEVER TIMOTHY POLLEN EXTRACT-MULFORD.—A liquid obtained by extracting the proteins from the pollen of timothy (*Phleum pratense*) and standardizing the solution by estimating the amount of protein contained in it: 1 unit equals 0.00016 Mg. of pollen protein. Preserved with 0.5 per cent. phenol.

Actions and Uses.—See article on Pollen and Epidermal Extract Preparations and Biologically Reactive Food Proteins, N. N. R., 1922, p. 232.

Dosage.—See general article on Pollen and Epidermal Extract Preparations and Biologically Reactive Food Proteins, N. N. R., 1922, p. 232.

Manufactured by the H. K. Mulford Company, Philadelphia. No U. S. patent or trademark.

Hay Fever Timothy Pollen Extract-Mulford.—Marketed in sets of four syringes containing, respectively, 0.0025 Mg. (15 units), 0.005 Mg. (30 units), 0.01 Mg. (60 units) and 0.02 Mg. (125 units) of pollen protein; in single syringe packages, one syringe containing 0.02 Mg. (125 units), one syringe containing 0.04 Mg. (250 units), one syringe containing 0.08 Mg. (500 units) and one intradermal syringe containing 0.0016 Mg. (10 units) of pollen protein; also in single vial packages, one 5 Cc. vial and one 20 Cc. vial, each cubic centimeter containing 0.02 Mg. (125 units), and one 5 Cc. vial containing 0.04 Mg. (250 units) of pollen protein.

Series A: one intradermal syringe containing 0.0016 Mg. (10 units), and five consecutive doses (1-5 inclusive) containing, respectively, 0.002 Mg. (12.5 units), 0.004 Mg. (25 units), 0.008 Mg. (50 units), 0.012 Mg. (75 units) and 0.016 Mg. (100 units).

Series B: one intradermal syringe containing 0.0016 Mg. (10 units) and five consecutive doses (6-10 inclusive) containing, respectively, 0.020 Mg. (125 units), 0.024 Mg. (150 units), 0.028 Mg. (175 units), 0.032 Mg. (200 units) and 0.036 Mg. (225 units).

Series C: one intradermal syringe containing 0.0016 Mg. (10 units) and five consecutive doses (11-15 inclusive), each dose containing 0.040 Mg. (250 units).

Complete Series: the three intradermal syringes and the fifteen consecutive doses described in Series A, B and C.

The pollen, after being dried, is ground in a ball mill to destroy the cell membranes. It is then extracted with physiological solution of sodium chloride. This extract is dried and finally extracted again with physiological solution of sodium chloride. The soluble proteins being brought into solution, a nitrogen determination is made on this extract, and the preparation is then standardized according to the protein (nitrogen) content.

DIPHTHERIA ANTITOXIN, CONCENTRATED (See New and Nonofficial Remedies, 1922, p. 280).

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NORMAL HORSE SERUM (See New and Nonofficial Remedies, 1922, p. 278).

E. R. Squibb and Sons, New York.

Normal Horse Serum.—(See New and Nonofficial Remedies, 1922, p. 279). Also marketed in packages of one 10 cubic centimeter syringe.

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SATURDAY, OCTOBER 21, 1922

A PANCREATIC HORMONE IN DIABETES

Less than half a century has elapsed since the pregnant discovery, by von Mering and Minkowski in 1889, of the highly important part which the pancreatic gland plays in the control of carbohydrate metabolism in the body. Their classic experiments demonstrated that if the pancreas is completely extirpated, hyperglycemia, glycosuria, and the complete loss of the power to burn glucose or other carbohydrates ensue. There are many reasons for believing that lesions of the pancreas in man lead to disturbances in the metabolism of sugar such as manifest themselves clearly in the diabetic. Whether the determining lesions are confined to the islets of Langerhans in the pancreas, as some pathologic histologists assert, or whether other groups of pancreatic cells may be concerned in the genesis of diabetes, cannot be definitely stated at present. It has become customary to postulate an internal secretion for the islets, and to make this responsible for the undoubted function of the pancreas in sugar metabolism. However, many cases of diabetes fail to reveal recognized defects in either the islets or the acinary cells, so that final pronouncements are unwarranted.

The general opinion is that sugar continues to be formed in the diabetic, from such precursors as are available, at the usual rate and to the usual extent. The defect in the metabolism relates to the subsequent destruction of the sugar. The disproportion between formation or mobilization of carbohydrate and its utilization in the organism is exemplified in the increased content of sugar circulating in the blood. Hyperglycemia is the most characteristic chemical symptom of diabetes. As might be expected, there have been numerous attempts—surely many, many more than the published literature would disclose—to supply the missing "regulator" of sugar combustion; and attention has naturally been centered on the pancreas in this connection. The most significant results thus far recorded have recently been secured in the Department of Physiology at the University of Toronto under the leadership of J. J. R. Macleod.[1] These investigators have prepared products from the pancreas by extraction with alcohol which apparently enable the diabetic animal and man to metabolize sugar better. The evidence lies primarily in the reduction of the hyperglycemia of such patients after administration of the suitable pancreatic extracts.

The latest experiments by the Toronto workers[2] bring the significant evidence that injections of the substance isolated lower the content of sugar in the blood of normal animals as well as those rendered diabetic. Its importance lies in the implication that the action of the active component or pancreatic hormone is a fundamental one in the control of the blood sugar. It is not difficult experimentally to effect a lowering of the blood sugar in a few hours, through high dosage, to a point at which serious symptoms attending the hypoglycemia ensue. These can in turn be combated by administration of glucose, a possibility also demonstrated for the hypoglycemia consequent on extirpation of the liver.

The pancreatic factor apparently does not unfold its characteristic effect in the blood stream itself, for it does not influence the glycolytic power of blood in vitro or the rate of postmortem glycogenolysis in the liver. According to the findings of Hepburn and Latchford[3] at Toronto, on the other hand, the influence of the new extract is exerted in the active tissues themselves. At any rate, it has the ability to increase the consumption of sugar in mammalian muscle, as demonstrated by the rate at which reducing substance disappears from nutrient fluid that has been repeatedly perfused through the surviving heart. The investigators are wisely withholding the product from general use while it is undergoing thorough trial by specially selected experts in metabolic diseases and in properly controlled hospitals.

The history of medicine warns us against undue haste in the acceptance of "specifics" applicable to bodily functions. Nevertheless, scientific progress should always challenge our enthusiasm, and may be excused if it awakens the hopes that spring eternal in the mind of man.

1. Banting, F. G.; Best, C. H., and Macleod, J. J. R.: Am. J. Physiol. **59**: 479, 1922. Banting and Best: J. Lab. & Clin. Med. **7**: 251, 1922. Banting, Best, Collip, Campbell and Fletcher: Canadian M. A. J. **12**: 141, 1922.

2. Banting, F. G.; Best, C. H.; Collip, J. B.; Macleod, J. J. R., and Noble, E. C.: The Effect of Pancreatic Extract (Insulin) on Normal Rabbits, Am. J. Physiol. **62**: 162 (Sept.) 1922.

3. Hepburn, J., and Latchford, J. K.: Effect of Insulin (Pancreatic Extract) on the Sugar Consumption of the Isolated Surviving Rabbit Heart, Am. J. Physiol. **62**: 177 (Sept.) 1922.

MORE FACTS ABOUT THE GALLBLADDER

Some of the uncertainty with respect to the function of the gallbladder is gradually being dispelled in the light of new experiments. The traditional view that the chief activity of this organ is storage has been supported, if not actually magnified, by Rous and McMaster's striking demonstrations of how much inspissation and concentration of bile may occur in the bladder, and how dilution can subsequently be accomplished through the secretion of "white bile" by

the ducts through which the thick secretion may pass. Recently, too, attention was called to the possible service that the galbladder may render in protecting the bile ducts and sphincter from undue changes in pressure within the system. How and when the bladder discharges its occasional surplus contents is not so clearly understood. The results of investigation are often difficult to interpret because of the anatomic differences between the species of animals used for experimental investigations in this field; and the problems are not simplified by the fact that some species exist without any gallbladder whatever, while in others, including man, the surgical removal of the organ is not incompatible with comfortable existence.

Some of these debatable features touch on a phenomenon which has become the subject of active interest and debate in clinical medicine: the applicability of the principle of so-called "contrary innervation" to the biliary tract. Assuming, on this basis, that a relaxation of the sphincter at the ampulla of Vater is accompanied by the "reciprocal" innervation of the nerves going to the gallbladder, followed by a contraction of its musculature, it has been proposed to secure bladder contents as desired by initiating their expulsion on this principle. When magnesium sulphate is introduced into the duodenum within the neighborhood of the papilla through which the bile is discharged, a flow of the latter usually occurs. A group of clinicians have assumed that this secretion comes primarily from the contracting gallbladder, so that if it is removed by aspiration from the duodenum it can be subjected to chemical or bacteriologic examination. The columns of THE JOURNAL have presented many details with respect to the problem.

Into the prevailing uncertainty, Auster and Crohn [1] have injected experimental evidence gained through studies on the dog, which has a gallbladder resembling that of man in anatomic structure, of scanty musculature and of poor contractile power. The efficiency of its nervous control is also by no means clearly emphasized. By introducing easily detectable foreign dyes into the gallbladder, it was possible to follow the movements of the contents. According to Auster and Crohn, the application of concentrated solutions of magnesium sulphate to the duodenal mucosa and papilla of Vater of the dog causes a stimulation of bile flow as do numerous other substances, some of which have an alimentary significance; but—and this is the crux of the contention—they do not cause expulsion of bile from the gallbladder. The latter is not necessarily distended when an animal is in the fasting state, nor is there always a flow of bladder bile during the height of digestion. Consequently, these investigators conclude that the usual flow of bile originates in the liver and sweeps down the ducts into the duodenum, disregarding in main part the gallbladder. Such variations as occur are believed to arise in the liver in answer to various types of food stimuli. It does not seem to Auster and Crohn that the gallbladder enters into the physiology of bile excretion as an active organ. At any rate, they do not regard it as having an ejaculatory mechanism or the proper musculature for such a function in the same sense as that in which one speaks of the contractile urinary bladder. To them the outflow from the gallbladder appears to be in the nature of an overflow incontinence. Under pathologic conditions one knows that this organ is capable of great distention, acting at such times as a relief to intraductal pressure. Such a function, they conclude, is complementary to its great capacity to concentrate the bulk of bile by dehydration.

1. Auster, L. S., and Crohn, B. M.: Notes on Studies in the Physiology of the Gallbladder, Am. J. M. Sc. **164**: 345 (Sept.) 1922.

INTEREPIDEMIC INFLUENZA

The study of epidemiology is awakening a greater interest, and enlisting larger efforts in its behalf, than ever before. In his History of Medicine, Garrison speaks of it even today as "the infantile science of epidemiology, just emerging from the descriptive stage." [1] The predisposing factors of many epidemics of the medieval period, such as the crowded condition and bad sanitation of the walled towns, "the squalor, misrule and gross immorality occasioned by the many wars, by the fact that Europe was overrun by wandering soldiers, students and other vagabond characters, and by the general superstition, ignorance and uncleanliness of the masses"—many of these have gone, let us hope, forever. If some epidemic diseases have almost vanished, or at least become greatly modified in severity or distribution, there are, nevertheless, others still with us to take their victims, and consequently to demand renewed investigation.

Among the earliest of the great medieval pandemics was influenza; it was prevalent in the eighteenth century; the ravages of the great epidemics of 1890 and 1918 are still fresh in the memories of present-day physicians. They should be further aware that the term influenza occupied a conspicuous place among the reported causes of death during intervening periods. In some years the death rate attributed to it has actually been greater than that ascribed to either diphtheria or typhoid, for example. Every physician realizes that there is considerable looseness and inaccuracy in the use of the term influenza. From the standpoint of epidemiology, it is highly important to know whether the so-called influenza of interepidemic years, such as those between 1890 and 1918, is the same disease as that of the pandemic periods.

The crux of the problem is expressed by a recent writer, who asks whether there actually still exists in Europe and North America a residue of cases and

1. Garrison, F. H.: History of Medicine, Philadelphia, W. B. Saunders Company, 1921, p. 748.

deaths from true influenza which keeps a thread of continuity between the great outbreaks. It will be readily admitted that the name influenza is used to cloak much that is not identical bacteriologically or clinically with the memorable epidemic disease. This may be due to faulty or indifferent diagnosis. It may also be due to a change in the type of the disease from decade to decade. There have been times when it has been somewhat fashionable in scientific circles to speak of alterations in infectivity or variations in virulence. In a De Lamar lecture delivered at the Johns Hopkins University, Jordan[2] insisted that there is no escape from the conclusion that the so-called influenza of interepidemic years is in whole or in part different from the influenza of the great epidemics of 1918 and 1890. A great many of the deaths, he adds, are certainly not due to the same microbic causes as those occurring in epidemic years.

The available statistics, so far as they can be utilized for comparison, show many items of similarity between the epidemics of 1890 and 1918. The age incidence, for example, is similar, whereas it is sharply differentiated from that of the influenza of interepidemic years. Difference in racial mortality also occurs; thus, the greater relative increase in the mortality from influenzal pneumonia in the white as compared with the negro race constitutes a distinguishing feature of the 1918 epidemic, and serves to mark it off from the influenza of the preepidemic years. It also seems to Jordan that there is a lack of correspondence between influenza and pneumonia rates in the different periods sufficiently significant to be stressed, even if it cannot be included in the more compelling statistical evidence. The problem here involved is a highly complex one that demands the resources of the most expert, and invites the critical attention of the most skeptical. The uncertainty which remains regarding the real nature of the etiologic microbial agents involved is one of the greatest stumbling blocks in the road to progress. Whether or not one agrees with Jordan's main thesis, there will be no contradiction of his plea that localized outbreaks and, indeed, individual cases of influenza-like disease and of all mild respiratory diseases seem to demand more searching study than they have yet received, bacteriologically, epidemiologically and clinically.

2. Jordan, E. O.: Interepidemic Influenza, Am. J. Hyg. **2**: 325 (July) 1922.

Birth and Death Statistics.—The Census Bureau has issued figures on the death and birth rate in the registration areas of the United States for the year 1921. The death rate was a record low one, the figure being 11.7 per thousand inhabitants in 1921 as compared with 13.1 per thousand inhabitants for 1920. The infant mortality rate also decreased from 86 per thousand inhabitants in 1920 to 76 per thousand inhabitants in 1921. The registration area includes a population in this country of 70,425,000. Figures on the birth rate show 24.3 per thousand for 1921, as against 23.7 in 1920. The statement of the Census Bureau further shows 1,714,261 births for the year, and 823,511 deaths, of which 129,588 were of children.

Current Comment

THE METABOLISM OF PREMATURE INFANTS

The intelligent management of premature infants obviously presupposes some knowledge of the physiology of the organism under the conditions characteristic of such early birth. Lately a number of independent evidences have been secured indicating that the basal metabolism of premature infants tends to be low.[1] According to Talbot and his collaborators, the figures are low whether they are calculated on the basis of body surface, the present conventional method, or in relation to other factors. Hence they argue that the reduced metabolism is dependent on the fact that there is a very small amount of active heat-forming tissues in these incompletely developed infants. Of the infants observed by Murlin and Marsh, those exhibiting very low basal metabolism died; hence these investigators remark that as basal metabolism is the best single measure of vitality yet found, it is probable that this test will prove to be an important means of prognosis in prematurity. In explanation of the metabolic phenomena of premature infants, which are quite in contrast with the relatively high metabolism at more mature stages of childhood, Talbot and Sisson believe that the active, heat-forming, "protoplasmic" tissues are unable to respond to the excessive heat loss from the body, and, as a result, there is a subnormal temperature; that the amount of heat formed depends on the amount and tone of the active protoplasmic tissues and not primarily on the size of the surface of the body of these infants. In the cases studied, the children did not gain in weight until they were able to digest approximately 200 calories daily. The only food completely assimilated to accomplish this was human milk. A relatively large proportion of the food intake goes to form new body tissue. The large excess of the caloric intake over the basal metabolism was necessary because of the relatively greater amount of growth essential for the normal development of these babies.

CAPILLARY BLOOD PRESSURE IN HYPERTENSION

Renewed and improved study of the circulation of the capillaries has demonstrated the necessity of revising some of the prevailing views of the functional activities of these vessels. Hooker,[2] in pointing out that we must reorganize our conceptions of functional peripheral resistance, has remarked that it has heretofore been limited to the arteriole, the caliber of which is controlled by a muscular coat subject to nervous and chemical influences. The resistance to the flow of blood by the capillary and venule has been regarded as essentially fixed. Now we know, he adds, that beyond

1. Talbot, F., and Sisson, W. R.: Basal Metabolism in Relation to Body Surface at Different Ages, with Special Reference to Prematurity, Proc. Soc. Exper. Biol. & Med. **19**: 309 (April) 1922. Murlin, J. R., and Marsh, Elizabeth: Basal Metabolism of Premature and Undersized Infants, ibid., p. 431. Talbot, F. B.; Sisson, W. R.; Moriarty, Margaret E., and Dalrymple, Alice J.: The Basal Metabolism of Prematurity, II, Relation of Basal Metabolism to Caloric Intake and Weight Curve, Am. J. Dis. Child. **24**: 95 (Aug.) 1922.

2. Hooker, D. R.: Evidence of Functional Activity on the Part of the Capillaries and Venules, Physiol. Rev. **1**: 112 (Jan.) 1921.

the arteriole the capillary and venule function actively, and must therefore participate directly in vascular reactions. It was doubtless considerations of this sort that led Boas and Frant [3] of the Montefiore Hospital for Chronic Diseases, New York, to examine the part the capillaries may play in the causation of hypertensive states. Not until the more recent investigations of capillary functional changes has it seemed likely that the capillaries themselves may be concerned in the maintenance of high arterial pressure. According to Danzer and Hooker,[4] the normal capillary blood pressure of man ranges from 18 to 22 mm. of mercury, and rarely exceeds 30 mm. Boas and Frant have found, however, that patients with hypertension fall within two groups that cannot be differentiated clinically. In the first group the capillary pressure ranges between 21 and 70 mm. of mercury, rarely higher and only very exceptionally lower. Most of the readings fall between 30 and 60. In the second group the capillary pressure falls within the range of normal, with a tendency to be low rather than high. In essential hypertension, the capillary pressure is low; but it is suggested that patients who exhibit high capillary pressures may be suffering from a general capillary disease with a glomerulonephritis as one of the manifestations. This is, of course, still mere conjecture. Nevertheless, in view of the great uncertainty and confusion still existing with respect to the interrelation of hypertension and kidney disease—a confusion in which cause and effect are not readily differentiated—the facts just discovered suggest that newer methods of studying the capillaries may yet lead to developments of fundamental significance for the study of blood pressure and its pathologic manifestations.

THE CAUSE OF INFLUENZA

In a recent extensive review of our knowledge of the cause of influenza, about which so much has been written during the last three or four years, Zinsser [5] devotes special attention to the relation of the influenza bacillus to the disease whose name it carries. Zinsser defines influenza as a mild fever of a few days, with sudden onset, characteristic pains in the head, back and limbs, and great prostration. Slight sore throat, mild bronchitis and conjunctival injection may be either primary or secondary. This is the form in which influenza makes its first appearance; as such, and free from complications, it causes few deaths, and to find the cause of this basic disease, which may be followed by highly dangerous secondary respiratory infections, is the etiologic problem of influenza. In favor of regarding the influenza bacillus as the essential cause, Zinsser mentions its frequent isolation from early and simple cases; the frequency of its presence in complications, both early and late, and its peculiar distribution in the bronchi in fatal cases; its wide distribution among the population at the time of influenza epidemics, followed by a gradual diminution as they subside; and, finally, the fact, recently announced, that the influenza bacilli can produce poisons potent enough to explain the symptoms. Against regarding the influenza bacillus as the primary cause of influenza, Zinsser places the frequent failure to find it in the early stages of the disease; its presence in healthy persons and in patients with other diseases than influenza, notably measles, in which it may be found in as many as 65 per cent. of the cases; its occurrence, according to some observers, in a prodigious number of distinct strains with different antigenic properties, an observation, inviting further study, that does not harmonize well with the idea of the bacillus being the cause of a specific disease; and, finally, the failure of human inoculations with influenza bacilli to produce reactions like that of epidemic influenza, as well as the failure of injections of vaccines of the bacilli to protect against influenza. Added to these considerations is the further circumstance that several reports have been made of the production in human beings of influenza-like diseases with apparently bacteria-free filtrates of materials from the respiratory tract of influenza patients. And here it may be pointed out, too, that almost the same kind of statement as this in regard to the influenza bacillus could be made for and against the etiologic relationship to influenza of streptococci, especially of the viridans group, which some might think Zinsser has neglected. In our editorial discussions of influenza at the time of the 1918 epidemic, it was maintained that the influenza bacillus had not been shown to be the cause of influenza, and that wholesale injections of vaccines of this bacillus for the purpose of prevention were not warranted. The correctness of this view is upheld by the subsequent developments now summarized by Zinsser, whose primary friendliness to the cause of the influenza bacillus is obvious. The cause of influenza still remains an unsolved problem. In view of the ease with which complicating organisms like the influenza bacilli and streptococci gain foothold apparently almost as early as when the primary infection sets in, the hope of solution of this etiologic problem lies in the study of adolescent epidemics rather than of epidemics already in full swing.

3. Boas, E. P., and Frant, S.: The Capillary Blood Pressure in Arterial Hypertension, Arch. Int. Med. **30**: 40 (July) 1922.
4. Danzer, C. S., and Hooker, D. R.: Determination of the Capillary Blood Pressure in Man with the Microcapillary Tonometer, Am. J. Physiol. **52**: 136 (May) 1920.
5. Zinsser, Hans: Etiology and Epidemiology of Influenza, Medicine **1**: 213-311, 1922.

THE DOCTOR AND THE DOG

Supreme among the stories of dogs is "Rab and His Friends" written by a physician. Again and again physicians have demonstrated in their writings and in their work an essential kindliness toward the dumb, the weak and the needy. It is reasonable to believe that proportionately more physicians than laymen revel in the ownership of animal pets, particularly horses and dogs. In the day when almost every physician depended on the horse for transportation, practically every physician understood animals, owned them, cared for them and was kind to them, and the spirit has not changed. Recently the Chicago Literary Club in selecting one of its papers for publication selected "Duke" the story of a dog by Charles Bert Reed, a physician. In this story is revealed a humane understanding of animalkind. The devotion of the smiling Duke is a contrast to the cringing, snarling beast portrayed prostrate before the physician in anti-

vivisection literature. The true physician, the real scientist, is never the bloodthirsty savage depicted in the sadistic imaginings of the antivivisectionist reformers. The same spirit which moves him to devote his life to the relief of mankind gives him a love for all that is living and draws to him the sympathy of animalkind. After all the matter is relative. The scientist sees life as a sacrifice of some for the benefit of the many. The antivivisectionist sees only her own exaltation in the eyes of an unthinking public. "The antivivisectionist," says George Jean Nathan, "strains at a guinea pig and swallows a baby."

PENNSYLVANIA'S WOMEN ON ANIMAL EXPERIMENTATION

The women of Pennsylvania refuse to be humbugged by the propaganda of the antivivisectionist. At the annual meeting of the State Federation of Pennsylvania Women, October 12, at which more than 600 women were present, this resolution was adopted:

WHEREAS, It has been conclusively demonstrated that the health and happiness of hundreds of thousands of animals, and of many millions of human beings, have been promoted and their lives prolonged by the application of knowledge obtained through scientific experiments on animals; and

WHEREAS, These researches are conferring a wonderful boon upon the starving nations by constantly adding greatly to the food supply of the world; therefore be it

Resolved, that the State Federation of Pennsylvania Women, assembled in annual general convention in the city of Reading, Pennsylvania, on the twelfth day of October, 1922, hereby put on record their gratitude to medical science for past discoveries so profoundly beneficial to human beings and to animals, and we believe that such beneficent researches should be continued and encouraged.

The resolution was adopted with virtual unanimity. Only a few—possibly fifteen or twenty—voted in the negative, and these feebly, as if ashamed. As the women present represented a total of more than 60,000 women throughout the state, it is safe to say that the heart of Pennsylvania is right for health and for humanity.

VOLUNTARY ACCELERATION OF THE HEART

The rate of the heart beat is ordinarily influenced by a variety of factors; when, for example, the arterial tension falls, the pulse rate is accelerated; with rise of blood pressure, the pulse rate decreases. Through what mechanism this adjustment is brought about has not been conclusively determined. Most of the sudden changes in the heart rate are effected through the nervous control of the heart by the action of the accelerator or inhibitory nerves. An increase in rate may arise from either a reflex excitation of the accelerators or a reflex inhibition of the tonic activity of the inhibitors. Many of the influences playing on this mechanism go on without the conscious intermediation of the person concerned. In this manner the state of activity of the visceral organs affects the heart. Again, the emotions may be attended with sensations that change the heart rate in an indirect way. Cases have long been known, furthermore, in which a more direct voluntary control of the heart rate seems to be possible, a classic instance being Tuke's [1] subject, aged 72, who was able by an effort of the will to accelerate his heart from 63 to 82, an increase of nineteen beats a minute. The precise factors involved have not been made clear in most of the cases of voluntary heart control on record.[2] Taylor [3] has recently been able at the University of Toronto to investigate critically the unique capacity of a medical student there to produce cardiac acceleration by an effort of the will alone. In him dilatation of the pupils, vasoconstriction and elevation of the blood pressure are associated with the increased heart rate. Atropin administration depresses but does not abolish the power of voluntary acceleration. Decided glycosuria occurs as an after-effect of a series of acceleratory efforts. Taking into account the sympathetic phenomena noted along with the cardiac acceleration, it seems probable to Taylor that the latter is due in part to the withdrawal of vagal tone and in part to excitation of the accelerators, the two influences being called into reciprocal action by the voluntary effort.

THE RISE OF GROUP MEDICAL PRACTICE

It is no new thing to refer to the restlessness which today agitates the collective mind of the medical profession as well as that of every social class and body. Not only have those who have taken special interest in medical practice given thought to these questions, but everywhere the rank and file, the general practitioner as well as the specialist, are discussing the future of the practice of medicine. At the last annual session of the Ohio State Medical Association, Dr. Martin H. Fischer [4] of the University of Cincinnati presented some views on these problems; he called for a harking back to the past, and for a recognition of the dignified origins from which modern medicine sprang. To the development of the crowd mind, Professor Fischer ascribes most of our unfortunate tendencies; the many who would emulate the success of the few, witnessing the financial rewards of the large groups and specialists, form new groups and also become specialists, though not willing to secure the adequate training responsible for success. Both the medical profession and the public suffer through the subsequent failure of such institutions and men in the practice of medicine. The present doctor, Professor Fischer says, "has sacrificed his individuality—the thing through which alone he has gained his public standing historically or in the present. Never before has he affected a community through mass action, and it is safe to predict that through such action he never—lastingly—will." Furthermore, Dr. Fischer lays the blame for present conditions on the medical profession itself. "If the medical profession has problems, it is because it has

1. Tuke: Illustrations of the Influence of the Mind upon the Body in Health and Disease, etc., London, 1872.

2. Tarchanoff: Arch. f. d. ges. Physiol. **35**: 109, 1885. Pease: Boston M. & S. J. **120**: 525, 1889. Favill and White: Heart **6**: 175, 1915-1917. Van der Velde: Arch. f. d. ges. Physiol. **66**: 232, 1897. Koehler: Ibid. **158**: 579, 1914. West, H. F., and Savage, W. E.: Voluntary Acceleration of the Heart Beat, Arch. Int. Med. **22**: 290 (Sept.) 1918.

3. Taylor, N. B.: Voluntary Acceleration of the Heart, Am. J. Physiol. **61**: 385 (Aug.) 1922.

4. Fischer, M. H.: Whither? Science **56**: 405 (Oct. 13) 1922.

either voluntarily relinquished what it should have held, or done badly what others have done better." The text that he preaches is the necessity for restoring public faith in the physician. The old personal relationship between physician and patient—an impossibility in the group—must be restored. Dr. Fischer likens the service of the group clinic to that of the cafeteria, in which one can serve oneself to a diagnosis as one serves oneself to a meal:

> One starts with a numbered card and buys himself at different counters and from different men a general examination, an investigation of the throat, a roentgen-ray plate of the gallbladder, a dental overhauling, a surgical operation, and a plaster cast for the foot. Each item carries its price, which is punched on the ticket. What the scheme takes no account of is that the patient does not care whether he has Hirschsprung's disease, erythema nodosum or pseudohypertrophic muscular atrophy. What he is after is a plain statement of what is the matter with him, and whether he can be "cured" or not; also there is wanted a little appreciation of his state of mind and some understanding of the economic hardships of his family in the interim of being ill. The food counters do not carry these dishes.

"The medical profession," Professor Fischer says, "will increase or lose its public power only as the collective expression of the people's faith in the individual doctors who touch them." The greatest medical achievements were not those of men working in great organizations, but of individuals utilizing to the utmost each his own opportunities. Boerhaave changed all of European medicine with twelve beds. Corrigan rewrote the chapter on heart disease with only six, and Külz, whose work fills one third of all the volumes on diabetes, had only two patients. It is time for the medical profession to discard the commercialism and the selling methods of the store, and to return to the methods of the fathers in medicine. It is a time for physicians with kindliness, tolerance and large understanding, the skill of hand, the skill of mind and the resourcefulness of previous generations.

DEFENDERS AND OPPONENTS OF VIVISECTION—A CONTRAST

Elsewhere in this issue (page 1448) appears the statement of the regents of the University of California and of the trustees of Stanford University, opposing the initiative measure against vivisection to be voted on in California. The sanity, logic and clear presentation of this document is a notable contrast to the confused, ecstatic, emotional outbursts of the hysterical females and sinistral men who support the measure. It is the opposition of the rational against the irrational; of the scientific mind against the muddled brain; of the practical leader of men against the unpractical, uncaring "reformer." Our world is what it is today chiefly because of the advances made through scientific investigation. Unfortunately, the clean, healthful, protected life means little to the short-haired women and long-haired men who have nominated themselves to lead this agitation against progress. The document of the educational leaders of California is an appeal to those persons in the community who can see straight.

Association News

RESOLUTION ON SECTION DELEGATES

Colorado State Medical Society Acts on Section Delegates

At the annual session of the Colorado State Medical Society just concluded, the following resolution in regard to section delegates in the American Medical Association was adopted:

> WHEREAS, The scientific usefulness and leadership of the American Medical Association depend largely on the scientific work of the Sections at the annual meetings; and
>
> WHEREAS, The past development and future progress of the Association have been due and must be due largely to the interest in and activity of the Sections:
>
> *Resolved,* That the Colorado State Medical Society is opposed to depriving the Sections of the representation they now have in the House of Delegates of the American Medical Association, amounting as it does to only one-tenth of the members of the House; and that the delegates from Colorado are instructed to express and carry out the views of this society upon the matter.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ALABAMA

Investigation into Food Poisoning Case.—As the result of nearly 700 children being poisoned by food eaten at Woodlawn School, Birmingham, Dr. J. C. Geiger of the U. S. Public Health Service has been sent to Birmingham to investigate the cause at the request of the public school and health officials. Laboratory examinations will be made of food served the children at lunch, September 27, after which more than 250 students became ill, the others being attacked later in the afternoon. Questionnaires have been sent to the 1,100 pupils; also to all heads of lunch rooms in the city asking that they state from which market they buy their meats and the price paid for it. Receipted bills for meat previously bought will be required of each school.

ARKANSAS

New Medical Society.—The physicians, surgeons and dentists of Conway County held a meeting at Morrilton, September 28, for the purpose of organizing the Conway County Medical Society. Twenty-five members were admitted. Dr. James M. Matthews was elected president; Dr. Walter H. Bruce, vice president, and Dr. Henry E. Mobley, secretary.

CALIFORNIA

Hospital News.—Construction work will be started this fall on a two-story and basement hospital building and twenty bungalows, to be erected by the Rose Hospital Association at Los Angeles, at an estimated cost of $350,000. The new hospital building will contain fifty rooms, three operating rooms and two wards. Dr. Carl T. Rose, formerly connected with the Mayo Clinic, is head of the organization. ——To relieve state hospitals in California from the care of insane ex-service men, the U. S. Veterans' Bureau will increase the capacity of the government hospital at Palo Alto by 500 beds. The present capacity is about 600 beds.

COLORADO

State Medical Meeting.—The annual meeting of the Colorado State Medical Society was held at Colorado Springs, October 9-10, under the presidency of Dr. Harry A. Smith, Delta. The following officers were elected for the ensuing year: president, Dr. Jacob Crum Epler, Pueblo; president-

elect, Dr. Melville Black, Denver; vice presidents, Drs. Thomas A. Stoddard, Pueblo, George A. Boyd, Colorado Springs, Edward P. Hummel, Sterling, and William W. Williams, Denver, and secretary, Dr. Frank B. Stephenson, Denver. The next session will be held at Glenwood Springs in 1923. Dr. Benjamin H. Orndorff, Chicago, read a paper on "Use of Roentgen-Ray in the Treatment of Deep-Seated Lesions."

DISTRICT OF COLUMBIA

Amalgamation of Child Welfare Societies.—At the annual conference of the American Child Hygiene Association in Washington, October 12-14, Dr. L. Emmett Holt, New York, president of the Child Health Organization, announced that the organization would unite with the American Child Hygiene Association, combining the aims of both societies to promote child health. Secretary Hoover of the child hygiene association gave an address in which he expressed the hope "that ten policemen would eventually be replaced by one community nurse."

Association of Military Surgeons of the United States.—Major-Gen. Merritte E. Ireland, Surgeon-General of the Army, and Rear Admiral E. R. Stitt, Surgeon-General of the Navy, outlined the medical work of the Army and Navy of the United States at the sessions of the Association of Military Surgeons held in Washington last week. A distingished assemblage of medical representatives of the military and naval forces of other countries were present. The foreign delegation included the following: Surg. Rear Admiral C. M. Beadnell of the British navy; Dr. Henri Rouvillois of the French army; Col. P. G. Goldsmith of the British army; Dr. Robert Picqué of the French army; Lieut.-Com. Joaquin Sanchez Gómez of the Spanish navy; Major B. Tanabe of the imperial Japanese army; Dr. Eudoro Aguilar of Peru, and Dr. Raguain of the Argentine Republic.

FLORIDA

Health Officer Has Dengue.—City Health Officer William W. MacDonell, Jacksonville, is suffering from dengue fever, it was announced, September 30.

ILLINOIS

County Health Center Established.—A county health center was formally opened in Walworth County, October 11. Dr. Mildred Van Cleve will give examinations once a month, and a county public health nurse will be in attendance.

Quarantine Letters Sent to Homes.—A system of letters and pamphlets, which state specifically the privileges of the house occupants, methods of disinfection, isolation of patients, and length of quarantine have been instituted by the quarantine officer in charge of contagious diseases at Rockford, and sent to homes where communicable diseases are located.

Public Nursing Service.—The Grundy County Tuberculosis Sanatorium board has employed a nurse to do general public health work throughout the county.——It is reported that, through efforts of the state department of public health, all public health nurses of the state have been organized into local units, each coextensive with a senatorial district, with the exception of three districts.

Township Physicians Appointed.—The board of supervisors has appointed the following physicians for La Salle County: Dr. D. S. Conley Bruce; Dr. R. Barrickman, Peru; Dr. A. C. Purcell, Eagle; Dr. E. T. Goble, Earl; Dr. Felix J. Maciejeyski, La Salle; Dr. John W. Landgraf, Seneca; Dr. William A. Pike, Ottawa; Dr. Oril C. Yoder, Peru; Dr. W. S. Sterrett, Rutland; Dr. William A. Pike, South Ottawa, and Dr. Edgar C. Cook, Mendota.

New Medical Board Begins Work.—Following the recent licensure scandal, several state medical licensing boards removed Illinois from their reciprocity agreement on all licenses granted under the Miller administration. It is stated that the only irregularities were in the examinations held in October, 1921, and January, 1922; that all licenses obtained during these examinations are to be subjected to review and that whenever irregularities are found the licenses will be revoked; all others are to be revalidated.

Chicago

Tag Day Benefits Charities.—More than $93,000 was collected, October 16, in Chicago, in the tag day held under the auspices of the Chicago Children's Benefit League, in which are represented fifty-one different charities.

Honor Woman Physician.—King Haakon of Norway has bestowed the Medal of Merit in gold on Dr. Ingeborg Rasmussen of Chicago, in recognition of her work among the Norwegians in this country. This is the first time the medal has ever been awarded to a woman outside of Norway, it is stated.

Chicago Medical Society.—The Chicago Medical Society gave a banquet at the Morrison Hotel, October 11, at which Dr. John S. Nagel, the retiring president, was the guest of honor. Dr. Charles E. Humiston, former president of the state society, was toastmaster, and Prof. Shailer Mathews of the University of Chicago, the principal speaker. Officers elected for the ensuing year were: president, Dr. Hugh N. MacKechnie; president-elect, Dr. Archibald Church, and secretary, Dr. Roy R. Ferguson.

Hospital News.—Plans are being considered for the erection of a $700,000 addition to the Englewood Hospital, Chicago, of which Dr. Egil T. Olsen is superintendent.——A large addition is now under construction at the Ravenswood Hospital, Chicago, the present capacity of the hospital being only forty-four beds.——A campaign is being conducted to raise $10,000 for construction of elevators and the equipment of rooms to complete the Columbus Extension Hospital, Chicago. This institution was begun in 1918 by the Order of the Sacred Heart Missionaries, and women drew the plans, superintended the construction work and did much of the manual labor.——The new Presbyterian Home was formally opened, October 10. The institution was constructed at a cost of $400,000 and when fully equipped will house 100 old and infirm persons, convalescents and orphans.

Personal.—Dr. George W. Hall was winner in the eighteenth annual golf Chiuncus of the University Club at Onwentsia Links, October 11.——Prof. Henry G. Gale, Ph.D., has been appointed dean of the Ogden Graduate School of Science at the University of Chicago to succeed the late Rollin A. Salisbury. Professor Gale was formerly dean of the science department and professor of physics. He is a chevalier of the French Legion of Honor and was cited for distinguished service when acting as lieutenant-colonel in the signal corps in France during the World War.——Dr. Joseph Beck sailed from Seattle, September 30, for the Orient. Dr. Beck is taking a six months' vacation and will visit hospitals and study throat, ear and eye diseases.——Dr. Jesse W. Taft, director of the department of child study, Seybert Institute, Philadelphia, gave a lecture at the Abraham Lincoln Center, October 20.——A. J. Carlson, Ph.D., head of the department of physiology of the University of Chicago, gave a Mayo Foundation lecture, October 12, at Rochester, Minn., on the "Visceral Sensory Nervous System and Recent Advances in the Physiology of the Alimentary Tract."——Dr. Gustavus M. Blech, Chicago, has been commissioned by President Harding as colonel in the M. O. R. C., U. S. Army.

INDIANA

Joint Medical Meeting.—At a meeting of the medical societies of Bartholomew, Jackson and Jennings counties, in Seymour, October 5, Dr. John P. Salb, Jasper, former president of the Indiana State Medical Society, and Dr. Charles K. Sowders, Indianapolis, were the guests of honor. The meeting was preceded by a banquet.

Psychopathic Lectures.—A series of lectures on the cause and cure of mental and nervous diseases will be given at the Central Indiana Hospital for the Insane through the fall and early winter, the last lecture being scheduled for Jan. 20, 1923. This course is a part of the special work of the study of psychopathology of the Indiana University School of Medicine. Illustrated lectures will be given on hallucinations, illusions and pseudohallucinations. Simon-Binet tests will also be made.

IOWA

Establishment of Big Health Program.—Dr. F. E. Sampson, Creston, has been appointed by the Iowa State Medical Society to direct a program for the establishment of a community hospital in every important city and town of Iowa. Dr. Sampson, who has been doing community hospitalization work for several years, moved to Des Moines recently, and will devote his entire time to the task of organizing community and rural health. Dr. Sampson states that in the greater community area of Iowa, with about 100,000 population, there are two churches for every hospital bed. He has outlined a plan for eventually building a community hospital in every county seat in the ninety-nine counties of the state, to be followed later by other community hospitals in the larger towns.

Tribute to Dr. Middleton.—At the seventieth anniversary of the Rock Island Railway System, a tree was planted at Iowa City in memory of the late Dr. William D. Middleton of Davenport, former dean of the medical faculty of the State University of Iowa and surgeon-in-chief to the Chicago, Rock Island and Pacific Railway, who died, in 1902, of septicemia, following a wound received while performing an operation. Dr. Thomas H. Macbride, president emeritus of the State University of Iowa, delivered an address, wherein he paid eulogy to Dr. Middleton. Following the planting of the tree, Dr. Middleton's daughter, wife of Dr. Samuel C. Plummer of Chicago, who fills the chief surgeonship that his father-in-law occupied, unveiled a bronze tablet dedicated to the physician.

KANSAS

Physical Examinations for Beauty Doctors.—The barber board of Kansas has recently announced that all beauty shop girls must submit to a physical examination. The girls objected to a man holding the examination, and Mrs. William Keith, Wichita, has brought legal action to prevent the barber board interfering with the operations of beauty shops. The case is pending in the local district court.

KENTUCKY

Bureau of Trachoma.—An advisory committee, made up of physicians, oculists and optometrists, has been appointed for the bureau of trachoma and conservation of vision of the state board of health. Dr. Gaylord C. Hall, Louisville, is chairman of the committee.

MARYLAND

Personal.—Dr. John S. Fulton, state health officer, Dr. C. Hampson Jones, commissioner of health of Baltimore, and Dr. Robert H. Riley, chief of the bureau of communicable diseases of the state department of health, attended the annual convention of the American Public Health Association in Cleveland.——Dr. George E. Vincent, president of the Rockefeller Foundation, recently gave a talk on "Politics and Public Health" at the school of hygiene and public health, Johns Hopkins University. Dr. Vincent inspected the school, which is endowed by the Rockefeller Foundation.——Dr. George H. Hocking of Govans is spending two months abroad, touring through Scotland and England.——Dr. Victor D. Miller, Hagerstown, was elected president of the Washington County Medical Society, recently.

Dohme Memorial Lectures.—The first course of lectures under the Charles E. Dohme Memorial lectureship was given in the medical amphitheater of the Johns Hopkins Hospital, October 10, 11 and 12, by Dr. H. J. Hamburger, professor of physiology at the University of Groningen (Holland).——In June, 1916, Mrs. Dohme offered to pay annually the sum of $1,000 to the trustees of the Johns Hopkins University to found a lectureship in memory of her husband, Charles E. Dohme, the well known pharmaceutic chemist of Baltimore. The purpose of the lectureship is to promote the development of a more intimate relationship between chemistry, pharmacy and medicine. The lectureship is open to scientists from any part of the world, and the selection of a lecturer is made by a committee representing the departments of pharmacology, chemistry and medicine, consisting of Professors Abel, Reid and Thayer.

MASSACHUSETTS

Additional Physicians Needed for Schick Test.—Owing to the increased activities regarding the administration of toxin-antitoxin to prevent diphtheria, Mayor Curley has authorized the health commissioner to appoint two additional physicians and three extra nurses to assist Dr. John A. Ceconi, who is in charge of the Schick tests being made.

Physicians' Institute.—The Institute of Physicians of the Boston Tuberculosis Association met, October 4-5, at the Massachusetts General Hospital, Boston. Dr. Allen K. Krause, Johns Hopkins Hospital, Baltimore; Dr. Cleaveland Floyd, Boston; Dr. Francis X. Mahoney, Boston, health commissioner; Dr. John B. Hawes, president of the Boston Tuberculosis Association, and Dr. Sumner H. Remick of the health department gave addresses.

Personal.—Dr. Arthur E. Brides, Boston director of the U. S. Veterans' Bureau, will retain that position, it was announced, September 10.——Dr. Edward C. Conroy, Andover, has been appointed chairman of the joint committee formed to take action on the offer of W. M. Wood to donate to the town a site for a school in the Shawsheen district.——Dr. Ransom Greene, Boston, has been appointed superintendent of the Taunton State Hospital to succeed Dr. Arthur V. Goss, who retires after thirty years' service.——Dr. Marion Cowan Burrows, Lynn, has been nominated as one of the three Republican candidates for representative from the fourteenth Essex district.——Dr. DeWitt G. Wilcox, Boston, has been appointed college physician of the school of engineering, Northeastern University. Dr. Wilcox was formerly professor of gynecology at Boston University School of Medicine.——Dr. Frank E. Bateman has been appointed city physician of Somerville by Mayor Webster. He will fill the unexpired term of Dr. C. Clarke Towle, who resigned on account of ill health.——Dr. Ester M. E. Sundelof, radiologist to the New England Hospital for Women and Children and the Lynn Hospital, has resumed her work after an extended trip abroad.——Dr. Martin W. Peck, medical officer at the Boston Psychopathic Hospital, has been appointed chief of the outpatient department of that institution, to succeed Dr. Douglas A. Thom, who resigned to become director of the division of mental hygiene of the state department of mental disease.——Dr. Margaret E. Desmond has been temporarily appointed assistant to Dr. C. Edouard Sandoz, director of medical services of the Boston municipal court.

MICHIGAN

Dinner for Dr. Snow.—The Lapeer County Medical Society gave a dinner in honor of Dr. Sparrow A. Snow, September 12, on the completion of his forty-fifth year of practice at North Branch.

MINNESOTA

Health Agencies Open Joint Office.—Joint headquarters for four of the largest private health agencies in Minneapolis were opened, September 30, on Eighth Street, Minneapolis, following a decision of the Citizens' Aid Society to donate the use of the house to the Hennepin County Anti-tuberculosis Society, the Hennepin County Public Health Association, the Minneapolis Visiting Nurse Association and the Infant Welfare Society. This building was formerly occupied by the Carry On Club, for disabled war veterans.

State Medical Meeting.—The fifty-fourth annual session of the Minnesota State Medical Association was held at Minneapolis, October 12-14, under the presidency of Dr. James Frank Corbett, Minneapolis. The following officers were elected for the ensuing year: president, Dr. Edward Starr Judd, Rochester; vice presidents, Drs. Theodore Bratrud, Warren, Harry D. Ritchie, St. Paul, and George H. Mesker, Olivia. Drs. Carl B. Drake, St. Paul, and Frederick L. Beckely, St. Paul, were reelected secretary and treasurer, respectively. The next annual meeting will be held at St. Paul in October, 1923. At a meeting of the wives of the members held at the state university, a woman's auxiliary of the state medical association was formed with Mrs. H. B. Sweetser, Minneapolis, as president.

MISSOURI

Tuberculosis Division of Health Board.—At the September meeting of the state board of health a division of tuberculosis was established. Dr. F. C. Smith of the U. S. Public Health Service was appointed to organize the work of this division.

Missouri Tuberculosis Sanatorium Extension Service.—A conference was held, September 26, between representatives of the state board of eleemosynary institutions and the Missouri Tuberculosis Association, for the organization of the Missouri Tuberculosis Sanatorium Extension Service. By this plan, the state board of managers of eleemosynary institutions and the Missouri Tuberculosis Association will extend the service of the sanatorium to the people of the state in a more general campaign against tuberculosis. Follow-up care will be given ex-patients of the sanatorium, and preventive educational work will be conducted in the families of patients. The aim of this service is also to secure cooperative efforts on the part of state institutions—eleemosynary, penal and educational—and to give cooperative service to city, county and private tuberculosis hospitals in the care and after-care of patients. The first undertaking will be to secure the cooperation of local organizations, such as public health nursing associations, tuberculosis societies, municipal health departments, and of county health officers, such local organizations and officers being asked to serve as local agents for the sanatorium in carrying out, in their respective territories and jurisdictions, appropriate lines of work. Through similar demonstration service, rendered by the tuberculosis association to the state teachers' college, the way was pre-

pared for the passage of the Missouri Physical Education Act last year, in which provision was made for the physical education, periodic physical tests, playground activities, nurse service and health supervision of all children in the public schools of the state.

NEBRASKA

State Reciprocity for Chiropractors.—Sixty chiropractors have applied to take the special examination to be offered in Lincoln by the state department of public welfare, November 19, to entitle them to practice in other states by reciprocity. The candidates are those licensed by waiver, who were practicing in Nebraska in 1915, at the time the state chiropractic examining board was created.

State Ruling Regarding Indigents.—The pauper law as sustained by the state supreme court decisions is to the effect that counties are responsible and should pay for all medical care of indigents within their respective boundaries. There is no institution in Lincoln for caring for and treating indigent venereal disease cases, and provision for such has not been made by legislation. Consequently, when infected persons have been sent to that city for treatment, there has been no other course but to send them back and assist in their receiving treatment at home.

NEW YORK

New York Academy to Celebrate Pasteur Centennial.—The library committee of the New York Academy of Medicine urges its members to lend memorabilia, such as letters, manuscripts, photographs, engravings or pictures of any kind relating to the life or work of Louis Pasteur. These will be used for the academy Pasteur celebration, Dec. 27, 1922, to Jan. 10, 1923; all communications to be addressed to Mr. J. S. Brownne, librarian.

Trees for County Tuberculosis Sanatoriums.—The state conservation commission is prepared to furnish trees for reforesting lands belonging to county tuberculosis sanatoriums on receipt of a written request from the superintendents of these institutions. The state department of health points out the advantages to be derived from the acceptance of this offer. Not only will the attractiveness of the surroundings of the sanatoriums be greatly enhanced, and a recreative environment added, but interesting employment may also thus be given to a number of patients whose condition may warrant light outdoor exercise. No charge will be made for the trees, but the sanatoriums will have to bear the expense of transportation.

Graduate Medical Lectures at Brooklyn.—Owing to the success of the free medical lectures instituted last spring, Dr. Frank D. Jennings, president of the Kings County Medical Society, and Dr. Charles A. Gordon, chairman of the committee of clinical instruction, arranged for another series of twelve lectures, to be held this fall. The fall term opened, October 13, at the building of the Kings County Medical Society, Brooklyn, and Dr. James Ewing, professor of pathology of Cornell University Medical College, delivered the first lecture. Dr. John Osborn Polak, professor of obstetrics and gynecology at the Long Island College Hospital, will deliver lectures, October 20 and 27. Dr. Thomas McCrae, Toronto, Canada, coauthor with the late Sir William Osler in his textbooks on medicine, will hold a clinic, November 3.

Hospital News.—A $1,000,000 campaign is being conducted by the Methodist Episcopal Hospital of Brooklyn for funds for a new maternity pavilion and to increase its endowment. ——The Dewitt Sanatorium, recently organized, will remodel a residence in Hancock Street, Brooklyn, at a cost of $100,000. Dr. E. H. Bartley is president of the sanatorium.——Dr. J. Carter Fisk, New York, has purchased the estate of Mrs. Bloodgood, comprising 230 acres of land, a residence and numerous outbuildings, at Oscawanna on the Hudson River, and will turn the property into a hospital for the treatment of nervous diseases. The property was held at $100,000.—— It is announced that the Municipal Hospital, Buffalo, will be converted into a detention home.——Plans have been completed for a new building to be erected at St. John's Hospital, Brooklyn, at a cost of $220,000.——An addition will be erected at the New York Orthopedic Dispensary and Hospital at White Plains in the near future.

New York City

Negro Health Week.—The week of September 27-October 4 was Negro Health Week in Harlem, held under the auspices of the Harlem Health Information Bureau. Dr. James Alexander Miller, president of the New York Tuberculosis Association, gave an address at the first meeting in the public library, and stated that three times as many negroes as white persons died in New York City every year of tuberculosis. The death rate from tuberculosis in 1921, Dr. Miller announced, was 299 for each hundred thousand negroes, as against 97 for each hundred thousand white persons.

OHIO

Physician's License Revoked.—The license of Dr. William Agnew, Akron, has been revoked by the state medical board, it is announced. Dr. Agnew was charged with unethical practice.

Ohio State University.—Fifty-two additional members for the Ohio State University faculty have been announced for the coming year. Among these, the college of medicine will have Dr. Robert W. Nosker as assistant professor of ophthalmology; Dr. Link M. Murphy, assistant professor of medicine; Dr. Russell G. Means, assistant professor of otolaryngology; Dr. Harry W. Hughes, technical physician; Dr. Holway D. Farrar, instructor in surgery, and Harold E. Lowery, laboratory assistant in bacteriology.

Illegal Practitioners Fined.—It is reported that C. A. Young, charged with receiving $125 for treatment of a cancer, was fined $100 and costs in Youngstown, recently. P. B. Derr, alleged to have received $70 for treatment of nervous trouble, was fined $200 and costs, and George Fink, charged with bleeding the patient whom Derr had previously treated, was fined $100 and costs. Against the "Rev. Dr." G. Schuster, there were three specific charges, one of which was for treatment of Frank A. Dorsey, state medical board inspector, who went to Schuster for treatment to secure evidence. Schuster pleaded not guilty and gave bond. One of the men who pleaded not guilty is said to have practiced a combination of alleged divine healing, fortune-telling and medical cure. When a patient visited him, he would first read the Bible, then deal a pack of cards and from deductions made from these maneuvers, prescribe for the patient.

Personal.—Dr. Laurence A. Connell, Orwell, has been appointed county health commissioner of Trumbull County. He will reside at Warren.——L. A. Pechstein, Ph.D., director of the department of psychology and education of the University of Rochester, has been appointed dean of the College for Teachers of the University of Cincinnati.——Dr. Desider Foldes, Cleveland, sailed, October 3, for Hamburg, Germany. ——Dr. Martin H. Fischer, professor of physiology in the University of Cincinnati, has been elected a foreign member of the German Leopold-Carl Academy of Scientists, in the division of scientific medicine.——Dr. Charles P. Emerson, dean of the Indiana School of Medicine, Indianapolis, and Dr. Allen Graham, Cleveland, delivered addresses before the Academy of Medicine of Cleveland, October 20.——Dr. Stanislas W. Smolik, following a trip to Europe where he spent considerable time at the University of Prague, will return to Cleveland this month.——Dr. Robert H. Grube, health officer of Xenia and Greene County, has resigned from these positions.——Dr. Carl L. Mueller, Wapakoneta, has been appointed district health commissioner for Auglaize County to succeed Dr. George L. Lyne, effective, Jan. 1, 1923.

PENNSYLVANIA

Personal.—Dr. Alfred W. Brinham has been appointed to the Scalp Level Borough Board of Health.——Dr. Lincoln S. Brown has been appointed chairman of the board of health of Dormont. Dr. Thomas M. Stahlman, formerly chairman of the board, resigned recently.——Dr. Irvin D. Metzger, Pittsburgh, and Dr. Calvin L. Johnstonbaugh, Bethlehem, have been reappointed members of the Pennsylvania Bureau of Medical Education and Licensure for the next three years. ——Dr. Harry E. Gettier has been appointed medical inspector of public schools of Littlestown, to fill the vacancy left by the death of Dr. R. H. Lindaman.

New State Clinic.—A new state and national free clinic, to be known as the Genito-Urinary Clinic, has been established in Oil City by the U. S. Public Health Service, in cooperation with the division of venereal disease of the state department of health. The establishment of this clinic has been made in conjunction with the Oil City Hospital, which was given authority to appoint a physician to take charge of this part of the work. Acting Asst. Surg. S. Leon Gans, director of the state division of venereal disease at Harrisburg, will be in direct control of the work, and Dr. W. Forrest Sharpnack, Oil City, will be in charge.

Hospital News.—The Bryn Mawr Hospital is erecting a maternity hospital, which, when completed, will increase the number of medical internships to four each year.——The new Waynesboro Hospital was formally opened to the public, October 2. More than 10,000 people attended the dedicatory ceremonies. Dr. Thomas S. Cullen, professor of gynecology, Johns Hopkins University, Baltimore, gave an address. Dr. Richard F. Kieffer, Baltimore, will be visiting surgeon to the institution.——A committee has been appointed to confer with the Cambria County commissioners in the drawing of plans and the building of a county hospital for the care of tuberculous patients. Dr. William G. Turnbull, Cresson, is chairman. A site for the hospital has been purchased, 2 miles west of Ebensburg on the William Penn Highway, at a cost of $23,000. The plans call for a 100-bed institution, which can be increased to 200 if necessary.

Resolutions Regarding Maternity Law.—Acting under instructions of the Lycoming County Medical Society, Dr. Charles J. Cummings presented the following resolution anent the Sheppard-Towner Maternity Law to the house of delegates of the Medical Society of the State of Pennsylvania, Scranton, October 3. The resolution was unanimously adopted:

The Medical Society of the State of Pennsylvania met at Scranton, Pa., October 3-6, in regular session, hereby declares itself in full agreement with the St. Louis declaration of the American Medical Association, which vigorous denunciation was, in effect, partly as follows: "The Sheppard-Towner Maternity Law is but a measure of mere political expediency; an imported socialistic scheme, totally out of harmony with and entirely unsuited to our form of government, which would impose an unjust and inequitable tax burden, in that it compels the people of one state to share the obligations of others."

The Medical Society of the State of Pennsylvania believes that the commonwealth is fully competent to regulate and properly adjust its own maternity problems. It is opposed to meddlesome federal interference in affairs of this nature, which it believes to be strictly the concern of the state and of which the state is the proper arbiter.

We respectfully request the governor of Pennsylvania, and the next legislature, when in session met, to refuse to accept the Sheppard-Towner Maternity Law.

Philadelphia

Pediatric Society Meeting.—The twenty-fifth anniversary of the Philadelphia Pediatric Society was celebrated recently, with a dinner at the City Club. There were talks by former presidents of the society.

Charities to Fight Tax on Bequests.—An effort to obtain the repeal of the state collateral inheritance tax of 10 per cent. on all charitable bequests will be made by a special committee appointed, October 12, by the Philadelphia Hospital Association, which will confer with members of the legislature and the new governor.

SOUTH DAKOTA

Health Exhibition.—The state board of health held a health exhibition at Mitchell the week of September 30-October 7. Posters showing the work of the South Dakota Public Health Association were shown and pamphlets on venereal disease control, infant welfare, sanitation, drainage, home hygiene and general health were distributed. The posters made by the public school children in the contest last year were also displayed.

TENNESSEE

Hospital News.—The Belle Norris Hospital, Savannah, a municipal institution, was opened recently.——The Civitan Club of Lenoir City is laying plans for the erection by the city of a hospital in the near future.——Drs. E. D. and E. T. Newell, owners of the Newell Sanatorium, Chattanooga, have purchased the Keystone Lodge for $33,000.

UTAH

Personal.—Dr. Mark Brown, roentgenologist at the Dee Memorial Hospital, Ogden, has been appointed state examiner of Utah and the surrounding states by the American Roentgen-Ray Society. Physicians specalizing in roentgenology and desirous of becoming members of the national society will be required to pass an examination, conducted by Dr. Brown, before being admitted to the society.

Utah Public Health Association.—The fifth annual meeting of the association was held in Salt Lake City, October 5, under the presidency of E. O. Howard. Dr. Warren A. Colton, U. S. Public Health Service, and Dr. Harry A. Pattison, medical director of the National Tuberculosis Association, New York City, delivered addresses. On motion the same officers of the association who have served the last year were reelected.

Physician's License Returned.—In an opinion handed down by the state supreme court, October 4, in Salt Lake City, annulment of the license of Dr. Charles Y. Moorehouse, made by the state department of registration on the complaint of the state board of health, was set aside, it is reported. Dr. Moorehouse was charged with failing to report in writing to the health officer the existence of a case of infectious disease which he was treating at Junction in 1920. On complaint of the state health department, the department of registration revoked Dr. Moorehouse's license to practice medicine. The supreme court ordered the department to reinstate the license in full force and effect.

VERMONT

New England Surgical Society.—At the annual meeting of the society in Vermont, September 22-23, the following officers were elected: president, Dr. John F. Thompson, Portland, Me.; vice president, Dr. Lyman Allen, Burlington; secretary, Dr. Philemon E. Truesdale, Fall River, Mass., and treasurer, Dr. Peer P. Johnson, Beverly, Mass. Dr. Eugene H. Pool, New York, spoke on "Injuries to the Spleen."

VIRGINIA

Virginia Valley Medical Association.—At the annual convention of the association in Clifton Forge, Dr. Hunter H. McGuire, president of the Winchester Memorial Hospital, was elected president; Dr. John M. Emmett, Clifton Forge, vice president; Dr. A. F. Robertson, Staunton, secretary, and Dr. John M. Biedler, Harrisonburg, treasurer.

New University Medical Society.—A medical literary society will be organized in the University of Virginia, Charlottesville, modeled after the Osler Historical Society, at the Mayo Clinic. The purpose of the organization will be to promote the mutual understanding and more intimate contact among the medical students and to give them the opportunity to develop their ability in the lines of public speaking and extemporaneous discussion.

WASHINGTON

Hospital News.—Plans have been completed for a modern hospital of frame construction on English cottage lines to be erected at Newport this fall at a cost of approximately $20,000. The hospital will be a community enterprise, built under the name of the Newport Hospital Building Association, and will be erected on a site donated by the Panhandle Lumber Company.——A new hospital building will be erected at the Leavenworth Hospital, Leavenworth, of which Dr. Albert Lessing is superintendent, at a cost of about $25,000.

WEST VIRGINIA

Addition Under Construction for King's Daughters' Hospital.—An addition is being erected at the King's Daughters' Hospital, Martinsburg, at a cost of approximately $25,000. New quarters for the nurses and a banquet room are also under construction.

Illegal Practitioner Fined.—The *West Virginia Medical Journal* states that V. W. Varmadoo, African herb "doctor" of Roanoke, Va., was arraigned recently before Judge Meeks at Williamson on the charge of illegally practicing medicine. He had obtained a county license from the sheriff entitling him to sell his medicine, but yielded to the persuasion of one of his "patients" to make a professional call during which he signed himself as "Dr." Varmadoo on a sick benefit certificate. He was fined $50 and costs.

WISCONSIN

Joint Medical Meeting.—A joint meeting of the medical societies of Forest, Florence, Marinette and Menominee counties was held at the home of Dr. William H. Dohearty, Peshtigo, recently.

Hospital News.—The property erected during the war at Washburn for the Haskell Club is now being remodeled into a hospital, which will be opened in the near future by the Washburn Hospital Association.——Plans to make Trinity Hospital a charity institution and to erect an addition to it, were made at a meeting of thirty physicians, members of the staff, at Milwaukee. Public donations to obtain 200 free beds in the institution will be sought at once. All medical attention will be free of charge to patients unable to pay.——The Sisters of St. Catherine of Racine have purchased the Uehlein residence on Galena Street, Milwaukee. It will be converted into a hospital.

CANADA

Radium for Quebec.—The Province of Quebec, it is reported, has purchased 1 gram of radium, at a cost of $100,000, from the United States Radium Corporation, for the treatment of cancer.

Health News.—Owing to the number of deaths recently reported from tetanus poisoning, all the catgut in the Toronto city hospitals has been collected by an order from the chief coroner, and an investigation will be held, it is reported.

Institute for the Blind.—The Canadian Institute for the Blind recently opened a department for the administration of massage treatment and other forms of physical therapeutics, at Pearson Hall, Toronto, under the supervision of Dr. D. J. McDougall. Treatments will be given at these quarters, or masseurs will visit patients on prescription of a medical practitioner.

French Scholarships for Canada.—The French government has offered a number of valuable scholarships to Canadian universities, including the universities of Toronto, McGill, Laval and Ottawa. The winner of a scholarship will spend the next academic year in France. The scholarship has a value of 6,000 francs, with an additional 1,000 for traveling expenses.

Personal.—Dr. Robert D. Defries is acting professor of hygiene in the University of Toronto during the absence of Prof. John G. Fitzgerald, who will spend the winter in California, where he will lecture at the University of California. ——Dr. Daniel C. Lochead, Gull Lake, Saskatchewan, has been appointed field secretary of the Minnesota Public Health Association.——Dr. C. W. Saleeby, F.R.S., London, chairman of the World League Against Alcoholism, who arrived in New York on the *Majestic* recently, addressed the Methodist General Conference at Toronto on the dangers of alcohol to public health.

Hadwen Heckled at Public Lecture.—On September 22, Walter R. Hadwen delivered, in Montreal, his lecture on "Vivisection." The meeting was attended by many surgeons and physicians who addressed the audience in connection with the lecture, refuting many of the statements which he had made. The Montreal *Gazette* reports that physicians present "contended that the statements made by the lecturer were such a travesty of the real facts that they insisted on telling the audience their side of the question." Following the usual lecture of Hadwen, physicians talked on experimental research and on the use of animals in the control of disease. They spoke of the gains brought about through experimental medicine, and "it was asserted that it (vivisection) had produced incalculable benefits to mankind, and that the lecturer was exploiting the emotions of people and was unreliable in his statements."

GENERAL

Brewers Attack Volstead Act.—Piel Brothers, former brewers, filed suit with the supreme court, Washington, D. C., October 16, attacking the validity of the Willis-Campbell amendment to the Volstead act, barring manufacture and sale of beer as medicine.

Railway Surgeons Annual Session.—The thirty-second annual meeting of the New York and New England Association of Railway Surgeons will be held at the Hotel McAlpin, New York, October 28, under the presidency of Dr. Donald Guthrie, Sayre, Pa.

American Association for the Advancement of Science.—The seventy-fourth annual meeting of the American Association for the Advancement of Science, together with associated societies, will be held in Toronto, Canada, December 27-31, under the presidency of Prof. Eliakim H. Moore, Ph.D., University of Chicago. Prof. L. O. Howard, of the United States Department of Agriculture, is the retiring president of the association.

Child Adoption League.—The State Charities Aid Association announces that the Child Adoption League has been formed in connection with its Child Placing Agency. This league will consist of both adults and children who are interested in helping to find homes for homeless, orphaned, neglected and abused children. The aim of the league is to stimulate the growing interest throughout the country in the welfare of homeless and dependent children.

Renewal of Permits (Form 1447) for Tax-Free Alcohol.—According to Prohibition Circular, No. 285, persons or corporations using tax-free alcohol must file applications for new permits before December 31. In order to facilitate the issuance of permits, the prohibition commissioner asks that applications be filed as far in advance of December 31 as possible. This applies particularly to laboratories in educational institutions and hospitals. Complete information may be obtained from the local prohibition directors.

Dengue Epidemic in Southern States.—Dengue fever has occurred in southern states to such an extent as to constitute an epidemic, it was stated at the headquarters of the U. S. Public Health Service, Washington, D. C., October 3, South Carolina, Georgia, Florida, Texas, Alabama and Louisiana reporting cases. Dr. Dowling reported 2,037 cases in Louisiana, and 1,800 cases are reported from Florida. No efforts are being made to quarantine the states affected. Dr. Charles E. Johnson of Sherman, Texas, recently died from the disease.

Military Surgeons Elect.—Col. Charles Lynch, M. C., U. S. Army, was elected president of the Association of Military Surgeons of the United States, at the close of its annual convention, held at the Walter Reed General Hospital in Washington, D. C. Other officers chosen were: first vice president, Col. Gilbert E. Seaman, Medical Corps, Wisconsin National Guard; second vice president, Senior Surg. J. C. Perry, U. S. Public Health Service; third vice president, Surg.-Gen. E. R. Stitt, U. S. Navy; secretary-treasurer, Col. James R. Church, U. S. Army, retired.

Massachusetts to Test Constitutionality of Sheppard-Towner Act.—The supreme court of the United States has granted the request of the state of Massachusetts for permission to test the constitutionality of the federal maternity law. The process has been ordered returned, Jan. 2, 1923. Massachusetts attacked the law on the ground that it "usurped" authority belonging to the states, and established a system of government "whereby certain governmental functions were performed by cooperation between the federal government and said states," from which Massachusetts is excluded by reason of its assertion of its sovereign rights. To accomplish the encroachment on state rights, the federal government, it is asserted by Massachusetts, offered to make available an appropriation conditioned on expenditures by the different states, and their cooperation in giving effect to the law.

Warren Triennial Prize.—At a meeting of the trustees of the Massachusetts General Hospital, October 13, it was voted that "two prizes instead of one be awarded this year, the first prize to be $500 and the second prize to be $250; the award of the second prize this year, however, shall not be taken as establishing a precedent." There were twenty-one essays submitted, the contestants being from Poland, Germany, Italy, Hungary, England and the United States. The first prize went to the essay, "The Circulation in the Mammalian Bone-Marrow," written by Cecil K. Drinker, M.D., Katherine M. Drinker, M.D., and Charles C. Lund, M.D., all of Boston. A second prize was awarded to the essay, "The Effect of Roentgen Rays on the Nuclear Division," written by James Mott Mavor, M.D., Union College, Schenectady, N. Y. A second prize was awarded this year because of the difficulty in determining the relative merits of the first two papers.

LATIN AMERICA

The Forero Prize.—The *Repertorio* of Bogotá relates that at the celebration of the semicentennial of the National Academy of Medicine of Colombia, the Manuel Forero prize was founded. It is to be awarded for the best scientific work offered in competition, and our exchange is urging the physicians of the country to compete.

French-Latin American Society.—Under the name of Umfia (Unión Médica Franco-Ibero-Americana), there has been organized in France, a society of French physicians knowing Spanish or related to Spanish-speaking physicians in Spain or Latin America. Dartigues, the vice president of the Paris medical society, is the president, and Dr. Mathé, rue Demours, 29 bis, Paris, is secretary.

South Americans Aid Cancer Drive.—Representatives of the Argentine republic have announced their intention to inform their governments of the manner in which the cancer campaign is carried on in the United States. Minister Dominici of Venezuela is having the literature of the campaign of education regarding cancer translated into Spanish, to be sent to that country for educational purposes.

Memorial Tribute to Laveran.—The *Revista de Ciencias Médicas* reports that the faculty of medicine of the city of

Mexico recently organized a ceremony in honor of the memory of Laveran, the French army surgeon who discovered the malaria parasite. Representatives of various scientific societies, the directors of the faculties and the dean of the university took part in the tribute. Laveran died in May.

Personal.—Dr. A. Quiñónez Molina of San Salvador has presented a collection of medical textbooks to the library of the Salvador Medical School.——Dr. R. Núñez Isaya of Venezuela has been made a member of the French Society of Ophthalmology. Dr. Núñez recently reported to the society the first case of ocular myiasis in France.——Dr. Giménez Cruz of Bogotá is at present at the head of the Colombian cabinet.——Dr. F. del Valle Atiles, editor of the *Bulletin of the Porto Rico Medical Association,* has returned to San Juan, after spending several years in New York City.——Dr. Carlos E. Roe, a gynecologist and surgeon at Madrid, is secretario de redaccion of the *Medicina Ibera,* which was founded six years ago. He is now visiting his old home, Lima, Peru.——Dr. V. Delfino of Buenos Aires, editor in chief of the *Semana Médica,* has been elected corresponding member of the National Academy of Medicine of Colombia.

FOREIGN

Golden Wedding of the Subscribers to the "Siglo Médico."—The *Siglo Médico* of Madrid has elected to honorary subscribership those subscribers who have been taking it regularly for fifty years.

Congress of Moral Ideas.—Three physicians are among the organizers of the Congrès belge des idées morales, which is to convene the last of this month at Brussels. The *Scalpel* states that it will bring together an élite of intellectuals and thinkers interested in ideas of moral progress.

The Endowment for the Lister Prize.—The fund collected by international subscriptions in honor of Lister is to be used to provide a prize of 2,500 pounds and a bronze medal, to be awarded triennially on his birthday for the most important progress in surgery, regardless of nationality.

Cajal in Automobile Accident.—Our Spanish exchanges relate that Prof. Ramón y Cajal received two superficial cuts on the head in an automobile accident in September, but they were not serious. He was returning from a sitting with the sculptor who is making a statue of him for the University of Zaragoza.

Society of Massage and Medical Gymnastics.—The annual meeting of the society was held in London, October 5-7. Lectures were given by Sir W. Arbuthnot Lane, Sir. Maurice Craig, Prof. Winifred Cullis, Dr. Walter J. Turrell and Mr. R. C. Elmslie, F.R.C.S., at Steinway Hall, and lecture demonstrations were given at St. Thomas' Hospital.

Dr. Grenfell's Mission Ship Sinks.—The *Strathcona,* Dr. Wilfred Grenfell's mission ship, after twenty years of service, sank off the coast of Cabot Island, October 2. Dr. Grenfell founded the Labrador Medical Mission in 1892; and this disaster calls for substantial interest in the work of the mission. Dr. Grenfell is in Europe at the present time.

National Historical Congress.—The Netherlands has a society for study of the history of the sciences, and it holds an annual meeting and exhibition. Prof. M. Neuburger of Vienna is to address the medical section at the meeting which is to be held this year at Gorinchem, October 22. He is professor of the history of medicine at the University of Vienna.

New Japanese Journal of Biochemistry.—The first number, January, 1922, has just appeared of the *Journal of Biochemistry,* published at Tokyo. It contains contributions from Japanese lecturers, written in English, French and German. It is published quarterly, 500 pages constituting a volume. The publication is edited by Samuro Kakiuchi, professor in the Tokyo Imperial University.

Psychanalytic Congress.—At the Psychanalytic Congress recently held in Berlin more than 250 persons attended from all parts of the world. Thirty papers were presented in German, English and French. A large contingent attended from England led by Ernest Jones. Among those from America were: Drs. Fred J. Farnell, Providence, R. I.; Horace W. Frink, New York; Mrs. Blumgart, New York, and George Morgenthau, Chicago. An International Psychanalytic Congress is scheduled for Baden-Baden in April, 1924.

Hongkong University College of Medicine.—Owing to a gift of approximately £60,000 ($300,000) to Hongkong University, last spring, for the creation of a modern school of medicine, with chairs of medicine and surgery, the curriculums of anatomy and surgery have been separated. Professor Digby will continue to hold the latter chair, while Dr. J. L. Shellshear, Sydney, Australia, has been appointed to the chair of anatomy. The chair of medicine, which calls for a candidate not exceeding 35 years of age, has not yet been filled.

Manson Memorial Medal.—Lady Manson was the recipient, September 26, of the first presentation of the medal struck in memory of Sir Patrick Manson, from funds collected by the Manson Memorial Fund, of which Sir William Leishman is chairman. This medal, which is in bronze, bears on the obverse a profile of Sir Patrick, and the device "Tropical Medicine and Hygiene." It will be presented triennially to any specially distinguished worker in tropical medicine, the recipient to be selected by the Council of the Royal Society of Tropical Medicine and Hygiene.

Foreign Books and Journals in Germany.—The university authorities in Germany have issued an appeal to all persons who have been recently given books or journals from other countries, to allow other persons to have access to them. They ask to have the data sent by postcard to the information bureau of the Union of German Libraries (Unter den Linden 38, Berlin). The data will then be card catalogued and will be ready on demand. The necessity for allowing others to use the donated books was emphasized by Dr. Simon Flexner of the National Education Board, on his recent visit to Berlin.

International Odontology Congress.—The Eleventh International Congress of Odontology convened at Madrid, Sept. 4, 1922. There were more than 400 delegates present, including Drs. Brophy and Kirk from the United States, one from Japan, Sweden, Austria and Argentina, Dr. Rojo from Mexico, and two each from Germany, France, England, Belgium, Italy and the Netherlands. The *Medicina Ibera* mentions that, at the operative session of the congress, Dr. Brophy performed a brilliant staphylorrhaphy operation. The congress lasted the entire week, and various excursions followed. The next gathering of the kind was appointed for Zaragoza in 1925.

Epidemic Conditions in Europe.—The U. S. Public Health Service has received from the Health Committee of the League of Nations at Geneva, Switzerland, a report calling attention in a forceful manner to the chaotic conditions that exist in certain parts of Europe. The report deals with the widespread prevalence of disease and the necessity of guarding the people of west Europe from these dangers. In the "epidemiologic intelligence" for September, 1922, two official reports of the Russian government are given as authority for the statement that the percentage in the fall of population varies from 3 in Siberia to as high as 14 for European Russia. An interesting statement was made to the effect that 3,500,000 of the deaths that have occurred in recent years were due largely to the great epidemics. In the districts comprising European Russia, modern Caucausus, Siberia, up to the Bikal, Kirghuz, and the two governments of Ukraine, it is estimated that the population has been reduced from 102,793,000 in 1914 to 93,790,000 in 1920. Normally there should have been an increase of about 12,000,000.

Deaths in Other Countries

Dr. **T. M. Frood,** for many years railroad surgeon of the South African Railways, veteran of the Boer and World wars, was found dead in bed, August 13, at his home in Johannesburg, South Africa, from heart disease.——Dr. **Tadeusz Godlewski,** professor of physics at the School of Technology at Lwów, aged 44.—Sir **James O. Affleck,** examiner in medicine and clinical medicine at the University of Edinburgh and of the Royal College of Physicians; ex-president of the Medico-Chirurgical Society of Edinburgh; specialist in exanthems; died, September 24.——Dr. **Christopher W. Narbeth,** at the Clinique des Alpes, following an appendectomy, September 17.——Major **W. J. Tobin,** R. A. M. C., as the result of an accident while riding, at Enniskillen, Ireland.——Dr. **John Hill** of Milan, Italy, in England, September 8, aged 66.——Dr. **Daniel Birtwell** of Natal, South Africa.——Dr. **Carl Hart,** prosector at the hospital at Schöneberg and noted for his research in pathologic anatomy, aged 45.——Dr. **P. Jacob,** director of a sanatorium near Munich and one of the editors of the *Zeitschrift für physikalische Therapie,* aged 52.——Dr. **Tourneux,** professor of histology at the University of Toulouse.——Dr. **Jourdanet,** radiologist at Grenoble.

Government Services

Vacancies in Medical Corps, U. S. Navy

Extraordinary efforts are being made to secure suitable candidates to fill vacancies in the Naval Medical Corps, according to Surgeon-General Stitt. The constantly increasing shortage of medical officers is becoming a serious problem in the efficiency of the medical department activities. In order to overcome the present shortage of naval medical officers, Surgeon-General Stitt has instructed commanding officers of naval hospitals, medical officers on recruiting duty and others to make special effort to get in touch with recent graduates of Class "A" medical schools, and those about to vacate internships in civil hospitals, with a view of presenting to those of suitable type the advantages offered by a commission in the Navy Medical Corps.

Recommendations on Discharge of Army Officers

Recommendations have been made by Surgeon-General Ireland of the Army that the War Department consider seriously, in connection with the legislative program, an amendment to the Elimination Law, to save certain classes of officers of the Medical Corps from being discharged from the service. Unless the law is amended, many officers of the dental, veterinary and medical administrative corps will have to separate entirely from the Army instead of being transferred to the retired list. It is proposed to relieve this situation by amendment to bills already pending in Congress.

New Program of Veterans' Bureau

Director Charles R. Forbes has announced that a material improvement in the medical service and treatment of disabled ex-service men will occur as a result of the new program undertaken by the U. S. Veterans' Bureau. Construction of new hospitals under the second Langley bill, he reports, will give the bureau a sufficient number of beds, under direct government management and supervised by government medical officers, to assure proper care of all soldier-patients. The list of hospitals projected by the bureau include:

A neuropsychiatric hospital at Northampton, Mass., the groundwork and foundation of which are now being constructed.
A 500-bed neuropsychiatric hospital at Chillicothe, Ohio, the bids for which have recently been received.
A 500-bed tuberculosis hospital at Chelsea, N. Y., to be constructed jointly by the Treasury Department and the U. S. Veterans' Bureau.
The Methodist Hospital at Memphis, Tenn., recently purchased to be used for general medical and surgical cases.
A neuropsychiatric hospital at Camp Lewis, Wash., plans and specifications to be ready before October 15.
A hospital for mental cases at Knoxville, Iowa, now being designed and planned.
A project at Livermore, Calif., for which bids will be ready within the near future.
A tuberculosis hospital at Tupper Lake, N. Y., for which ground excavations have been started.
A hospital at Gulfport, Miss.
A neuropsychiatric hospital, to be erected at Camp Custer, Mich.
A hospital to be constructed at St. Cloud, Minn.

Director Forbes declared that, with these hospitals completed, disabled war veterans will be promptly transferred from all contract hospitals in the country.

Report on Kings Bridge Veterans' Hospital

Administration of the Veterans' Bureau hospital in New York City, known as the Kings Bridge Hospital, was declared to be "clean, intelligent and wholesome" in a report submitted to Director Charles R. Forbes by a special committee appointed to investigate charges of bad conditions existing there, by Representative Rosedale of New York and Major John F. Deegan, commander of the New York department of the American Legion. The committee found that although force had been used in handling three former service men, these cases grew out of the lack of authority on the part of the head of the hospital, a condition which has been remedied. Since the installation of Dr. A. T. Chronquest as medical officer in charge, the committee declared, the institution has been managed in a "clean, intelligent and wholesome manner." The committee making the report was composed of Dr. Guy O. Ireland, chairman, representing the Washington office of the Veterans' Bureau; E. H. Jewett, representing the New York office, and Martin Littleton, New York attorney, representing the public.

Foreign Letters

PARIS

(From Our Regular Correspondent)

Oct. 2, 1922.

The International Council of Scientific Research

Monsieur Emile Picard, perpetual secretary of the Academy of Sciences and president of the International Council of Scientific Research, has just published an interesting article on the work of the council, the creation of which is due to the initiative taken by the Royal Society of London, the Academy of Science of Washington, and the Academy of Sciences of Paris. Toward the end of 1918, representatives of the allied and associated countries proposed the establishment of a central organization about which could be grouped international unions or societies corresponding to the various branches of science. These plans and projects took definite shape at Brussels in 1919, and the foundation of an International Council of Scientific Research, with headquarters in Belgium, was decided upon. Grouped about this central organization, various international scientific societies have been founded, with reference to which the international council may be called on to play the part of scientific adviser, more particularly for the organization of researches requiring the collaboration of several different societies. Since the general assembly held in 1919, invitations were sent out to the neutral nations to take part in the work of the new societies, and a large number of new members have been admitted.

Last July, the second general congress of the international council was held in Brussels (The Journal, Sept. 16, 1922, p. 977). New societies were organized, and some points in the constitution and by-laws were revised. The international societies, numbering nine, founded thus far are concerned with the following subjects: mathematics, astronomy, geodesy and geophysics, pure and applied chemistry, pure and applied physics, scientific radiotelegraphy, biologic sciences, medical sciences, and geography. It will be seen that the principal branches of science are thus grouped about the International Council of Research, the executive committee of which consists, to a great extent, of delegates from the various unions or affiliated societies. At present there are twenty-three countries represented, and for the time being it has not been thought advisable to increase the number.

Licensure in Medicine in France

There are at present two doctorates of medicine in France: a state doctorate and a university doctorate. Only the state diploma gives the right to practice medicine in France. The state diploma is not granted to foreign students. On completion of their studies, they receive only the university diploma. For some time, there has been much excited talk and agitation in opposition to the transformation of university diplomas into state diplomas. It was asserted that the minister of public instruction very readily granted this privilege, and it was rumored that a considerable number of diplomas had already been thus transformed. In reality, as has been shown by an inquiry conducted by the Syndicat médical de Paris, the total number of university diplomas bestowed since the creation of this type of degree is but 1,094, and only forty-four holders of university diplomas have succeeded in securing ultimately the state diploma. Furthermore, it is not accurate to state that a university diploma is transformed into a state diploma. In order to obtain a state diploma, the holder of a university diploma must comply with these three requirements: (1) He must have passed his

baccalaureate; (2) he must have become a naturalized citizen of France, and (3) he must take over again and pass successfully the last three examinations

The Participation of Women in Sport Activities

The medical congress on physical education recently held at Vichy adopted the following resolution with respect to the participation of women in sport activities:

Young women should not take up any form of sport activity without first being prepared for it by systematic, rational physical training. To allow women to take part in sport activities with the intensity and uncontrolled frenzy so often seen at the present day is to court grave physiologic consequences which will jeopardize in a most regrettable way the results sought, not only from the standpoint of the physical and moral development of women and of their general health, but also from the point of view of the amelioration of the race. The participation of women in sports, if it is to have happy results, must be under adequate control and under definitely fixed conditions. Written permission to engage in a given sport should be secured from a competent physician. Young men and women under 20 years of age, who are members of sporting clubs, should be compelled to refrain from taking part in any form of sport, and should confine their activities to general physical education destined to develop the body in an all around manner.

The Relation of Physicians of the Navy Medical Corps to the Strike of the Merchant Marine

On the occasion of the strike of the personnel of the merchant marine, which has extended to all our ports, the members of the "syndicate" of the navy medical corps of Havre and Saint-Nazaire adopted unanimously, at their last meeting, a resolution according to the terms of which the syndicate plans to limit its activity to the study of questions of a professional medical character and to hold itself aloof from the present discussions pertaining to the application of the eight-hour law.

Death of Dr. Léon Faisans

Dr. Léon Faisans, an honorary member of the staff of the Hôpitaux de Paris, died recently at the age of 71. Faisans was a collaborator of Professor Grancher, and had gained a reputation by his works on tuberculosis (more particularly tachycardia of the tuberculous), serofibrinous pleurisy, etc. He also made researches on chronic appendicitis and supported the theory of the epidemicity of appendicitis, claiming to have proved that a close relationship exists between influenza and appendicitis.

Another Victim of Roentgen Rays

Dr. Reiss, roentgenologist of the Hôpital Sainte-Blandine of Metz, has become a victim of roentgen rays. Several years ago, he had to have a finger amputated and later the whole right hand. He succumbed to the effects of the latter operation.

Reorganization of Hospital Laboratories

The municipal council of Paris has issued an announcement that the central laboratories of the Beaujon, Claude Bernard, Hérold, Trousseau and Boucicaut hospitals (likewise the laboratory of Dr. Louis Fournier in the Cochin Hospital) are to be reorganized as *laboratoires de secteur*, which will be called on to make bacteriologic examinations for the various neighboring institutions.

On the other hand, the central laboratories that are now located in the Hôpital des Enfants-Malades and the Hôpital Saint-Louis are to be transformed into general laboratories of the Hôpitaux de Paris, the former to serve institutions on the left bank of the Seine and the latter, institutions on the right bank. These two general laboratories will have a high-class equipment and will assume the responsibility of all the bacteriologic, serologic and anatomicropathologic work that the private laboratories and the *laboratoires de secteur* cannot attend to. The heads of the *laboratoires de secteur* must be candidates for the degree of doctor of medicine, former hospital interns of four or more years' experience, or they must hold the degree of doctor of science. They will receive an annual salary of 6,000 francs, while the heads of the general laboratories will be given an annual compensation of 10,000 francs.

BUDAPEST

(From Our Regular Correspondent)

Sept. 30, 1922.

Acute Articular Rheumatism in Children

At the recent meeting of the Interhospital Medical Federation, a paper was presented on acute articular rheumatism in children. Many authors have reported cases of rheumatism in the very young, although this disease is comparatively rare in children. It is possible that the disease is transmitted with the milk of the wetnurse. The incubation period in such cases is at least four days, the duration of the disease between two and four weeks. Both the duration and the severity of the disease are less in infants than in adults. In the former, it may run its course without any complications; while, in older children, endocardial and pericardial complications, as well as implication of the pleura and nervous system (chorea), are of frequent occurrence. This has been reported by Baudelocque, Rilles, Barber and others. Picot found 50 per cent. of his cases complicated with pericarditis; while Roger asserts positively that every rheumatic child's heart is bound to be attacked sooner or later. The author observed in his case a rather rare complication in the form of an effusion into the maxillary joint.

Local Anesthesia with Epinephrin-Cocain

According to Dr. Konrad, it has long been known that a part rendered bloodless is much easier narcotized; thus, the application of an Esmarch bandage tends to increase the anesthetic property of cocain or procain injected into the bandaged part. Epinephrin is used by Dr. Konrad in the following mixture: To a 5 per cent. solution of cocain hydrochlorate, there was added a 1:1,000 solution of epinephrin in the proportion of 2 drops to each cubic centimeter of the cocain solution. He employed this mixture for local anesthesia in forty-two cases, including lipoma of the external genital organs, phlegmon, epithelioma of the right cheek, cancer of the lower lip, chronic ascites of the ovary, atheromatous tumors of the forehead, fistula of the lower jaw and cancer of the breast. In all of the cases, complete anesthesia was induced. There was an entire absence of any parenchymatous hemorrhage, the anesthetic effect being observed also on the diseased tissues.

Dr. Konrad failed to observe any harmful effects of the mixture on the course of healing; nor were there any immediate toxic symptoms, with one exception. Anesthesia began ten minutes after injection, and lasted for almost two hours, thus enabling the operator to stitch up the wound painlessly. In operating in deep tissues, it is preferable to use weaker solutions of cocain, but in greater quantity. Some authors advise caution in old people and in children. It is a mistake to assume that local anesthesia may be employed only in so-called minor surgery; for, at a recent meeting of Budapest surgeons, reports were made of the successful use of local narcosis in such capital operations as appendicitis, laryngeal tumors and amputation.

The Artificial Interruption of Gestation by Bougies

In a recent meeting of the medical club of a provincial town, Dr. Jakoby read a paper on "The Artificial Interruption of Gestation by Bougies." The paper is based on a series of 228 hospital cases, and the procedure employed is as follows: The patient is given a cleansing bath, and the external genitals are washed with soap and water, but the vagina is not disinfected. The cervix is then seized with

one or two bullet forceps and a bougie (diameter 8 to 10 mm.) provided with a stylet is gradually introduced, being guided by the finger, and the stylet is slowly withdrawn. The bougie may be carried up between the bag of membranes and the uterine wall without any trouble. In 191 cases, one bougie was sufficient; in twenty-one, two were necessary; in two, three; and in one, four. The average time before rupture of the membranes took place was twenty-four hours; to the completion of labor, from thirty-one to forty-five hours. The nearer the end of pregnancy the procedure was instituted, the more readily were labor pains elicited.

The morbidity is stated by Jakoby to have been 6.8 per cent. in the 228 cases. Three cases of fatal issue may be ascribed to the method employed, two of these being through sepsis and one through peritonitis. In the latter case, the bougie failed, and cesarean section was resorted to. In 114 cases, pregnancy was interrupted because of a narrow pelvis; in sixty-five of these, labor came on spontaneously; in forty-nine, artificial delivery was found necessary; 65 per cent. of these children lived. As the morbidity rate is not higher than that of institutions in general, the method may be looked on as quite free from danger and affording a favorable outcome for the child. The simplicity of the method and the frequency with which the labor terminates naturally make it superior to the dilating bags, which practically means the introduction of an accouchement forcé or vaginal section.

PRAGUE

(From Our Regular Correspondent)

Oct. 1, 1922.

Venereal Disease Survey

Dr. Hynek J. Pelc presented to the Board for Study and Reform of Health Activities in the Czechoslovak Republic, September 30, a preliminary statement as to the results of a venereal disease survey which he has conducted under the auspices of the ministry of health. The first part of the survey deals with governmental functions pertaining to the campaign. Five ministries now deal with the problem. The survey suggests that an interministerial commission for the campaign against venereal diseases be appointed along the lines of the American Interdepartmental Social Hygiene Board, which would insure the unity of the work. The second part of the survey deals with private organizations which are active directly or indirectly in the fight against venereal diseases. There are two associations for combating venereal diseases in the Czechoslovak republic, one being Czech and one German. While the Czech association deserves credit for the introduction of abolition into the republic, the German association has undoubtedly surpassed it in organization. The survey suggests that the Y. M. C. A. committees which have been organized following the war by Dr. Stastna of New York be reorganized into local branches of the Czech association. The third part of the survey is devoted to educational activities.

A special part is devoted to the question of personal prophylaxis, which is a topic very much neglected in the Czechoslovak republic.

The fifth part of the survey deals with the treatment of venereal diseases. There are chapters on the quackery problem and on the improper advertising of the specific treatment. There are 110 approved specialists for venereal diseases in the republic. There is one specialist for each 16,000 people. There are twenty-six free dispensaries for the treatment of venereal diseases. Most of them are connected with a medical school. Thirty-eight Wassermann dispensaries are available for the laboratory service, thirty-six of which are public and two private. The detailed description of the laboratories, with an analysis of their activities, is followed by the recommendation for the erection of five more Wassermann laboratories, which should serve the districts where the laboratories do not suffice. A standardization of the technic for the Wassermann test is suggested which would make it possible to compare the results coming from different laboratories.

A special chapter is devoted to the treatment in sickness insurance associations, which represent the most important factor for the treatment of these diseases in the republic. Fifty-five per cent. of the people come under the insurance act, the largest proportion of whom live in cities. Therefore, the proportion of the population under the insurance system in cities where venereal diseases are most spread is much larger.

The measures for checking the spread of venereal diseases in maternity hospitals and in institutions for children are described in a special chapter. A very unsatisfactory situation has been found in prisons, where very little attention is being paid to this problem. It is estimated on the basis of the available figures that approximately one tenth of all syphilitics in the prisons are being treated effectively at the present time.

The sixth part of the survey is devoted to prostitution. It is estimated that there are 10,000 prostitutes in the republic, 1,748 of whom were under the system of reglementation, which has been abolished by the recent law. A rate per hundred thousand of population was figured out and presented on a map of the republic, from which it clearly appears that prostitution spreads with the growing density of the population and the development of industry. The seventh part of the survey is devoted to statistics.

The survey, which is accompanied by diagrams and maps, will be printed with English summaries at the end of each chapter. It has been undertaken in the ministry of health, in order to create a solid basis for the execution of the new law regarding venereal diseases, which was accepted by the parliament, July 11, and promulgated, Aug. 22, 1922.

BERLIN

(From Our Regular Correspondent)

Sept. 16, 1922.

The Catalytic Effect of Roentgen Rays

The similarity between numerous biochemical processes and certain catalytic reactions, together with the well-known fact that roentgen rays produce deep-seated biologic changes in the living organism which are accompanied by colloidochemical processes, caused Prof. Robert Schwarz and Prof. W. Friedrich of the Chemical and Radiologic Institute of the University of Freiburg to perform a series of experiments to determine what effect roentgen rays have on the course of catalytic reactions. As stated by the investigators in the Reports of the German Chemical Society, they chose as the simplest catalytic process the decomposition of hydrogen peroxid in water and oxygen by using metallic platinum in colloidal solution as a catalyzer. The numerous experiments showed that roentgen rays act as a "catalyzer poison," in that they effect a change in the character of the surface of the platinum. According to Schwarz and Friedrich, this change is produced by the fact that the roentgen rays, when they strike the various particles of platinum, bring about an emission of electrons which, in turn, decompose part of the water molecules. The investigators believe that the oxygen thus liberated is absorbed by the platinum, a capacity which this metal, as is well known, possesses in a high degree. According to a theory advanced by Professor Haber, with reference to the catalysis of hydrogen peroxid by platinum, the presence of dissolved or chemically combined oxygen in platinum is a prerequisite for decomposition. The platinum is, therefore, actually "poisoned" by the absorption of oxygen brought about by the roentgen irradiation. The workers

observed the same toxic action in connection with the roentgen irradiation of an actively catalytic ferment — catalase. Here, as well, the decomposition of hydrogen peroxid, as brought about by catalase, is much reduced; however, no definite and reliable statements concerning the mechanism of this toxic effect can be given, as yet. What importance these observations have for the further development of the chemistry of catalytic processes, especially in their technical application, cannot be exactly foreseen at this time; however, it is possible that roentgen irradiation could be used to retard or completely to check catalytic reactions already under way, whereby intermediary products that are no longer present when the reaction takes its full course could be detected. The "poisoning" of the catalyzers by roentgen irradiation would have the great advantage that the catalyzers so poisoned, as the writers state, attain their former action again in a relatively short time. A further advantage would lie in the fact that the influence can be applied from without, and the addition of foreign substances to the mixture in which the reaction is to occur is avoided. A renewed stimulus to biochemical research and therapeutic treatment by roentgen irradiation can be expected as the result of these investigations. The investigators expect to perform more detailed experiments to determine in how far the effect is dependent on the absorbed ray energy and to what extent on the wave length of the rays employed.

Bad Effect of Economic Distress on the Health of the People

At the meeting in Hamburg of the Verein deutscher Krankenhausärzte, Professor Loening of Halle delivered an address, following which this resolution was adopted:

German hospital physicians have observed that, in conjunction with the downward trend of the economic life, a serious falling off in the health of the people has set in, so that conditions resemble those that prevailed during the last years of the war. Such a downward movement leads to a shriveling of the psychic forces, and can end only in a new disaster. These adverse conditions threaten also the patients and the hospitals—the larger as well as the smaller—in which there is a scarcity of food, medicine and fuel. Only a quick and satisfactory solution of the economic distress can help out the situation. We call upon the physicians of all lands, mindful of their high calling, to contribute their share toward the restoration of the world's industries, the reconciliation of the nations as regards their mutual relations, and thus to the reestablishment of healthy conditions among all peoples.

Righthandedness and Lefthandedness Among Prehistoric Men

The scientist Sarafin examined, some time ago, a number of implements from the oldest and the most recent periods of the stone age; among others, more particularly the so-called Moustierian scrapers, sharp-edged flint instruments, which were used by the prehistoric inhabitants of the region of Moustier, France. These scrapers still show plainly the marks of usage. As it can be clearly distinguished which portions of the edges of the irregularly shaped implements are most worn, it may be ascertained with which hand prehistoric man was in the habit of working mainly. The investigations, which took various prehistoric implements into account, revealed the fact that men of the older and also of the more recent stone age worked with both hands almost indiscriminately. At the beginning of the age of bronze, however, a very sudden departure from the ancient habit is noticeable, for now almost all work is done with the right hand, as is shown by the fact that the implements show, from now on, the effects of wear in such places as indicate usage with the right hand. It is hard to say what may have been the cause for this sudden change from the uniform use of the two hands. Sarafin assumes that religious motives which possibly ascribed a baser significance to the left hand restricted its use, just as today popular superstition regards the left hand as emblematic of evil, while the right hand is spoken of as indicative of all that is good.

Marriages

MALCOLM D. WINTER, Miles City, Mont., to Miss Martha Jongewaard of Orange City, Iowa, September 20.

THOMAS HINCKLEY LANMAN, Cambridge, Mass., to Miss Gertrude Bradlee of Chester Hill, in September.

WILLIAM H. RUMPF, JR., Ann Arbor, Mich., to Miss Dorothy Rosholt of Minneapolis, September 6.

ROBERT W. FAULK to Mrs. Louise Hansen, both of Monroe, La., September 7, at Bay St. Louis, Miss.

JOHN C. WILSON, Dallas, Texas, to Miss Emily Harrison of Birmingham, Ala., September 20.

RICHARD H. MILLER, Boston, to Miss Georgina Mary Jardine of Moncton, N. B., recently.

HARRY PHILIP CAHILL, Boston, to Miss Anne T. Ryan of Bradford, Mass., September 30.

STEPHEN W. GRYCKZA to Miss Betty Helen Bellas, both of Hazelton, Pa., September 25.

STEPHEN C. REDD, Riverside, Ga., to Miss Louise Starr of Atlanta, Ga., September 14.

CHARLES MERRILL ROSE to Miss Ferol Irene Mosley, both of Chicago, October 9.

FRANK HILL CAMPBELL, Powers, Ore., to Miss Helen Reed of Eugene, August 19.

WILSON JAMES PERRY to Miss Ida Primrose, both of Billings, Mont., recently.

JOHN GABRIEL O'MALLEY to Miss Esther Schaaf, both of Chicago, October 10.

FLOYD M. DAY to Mrs. Lulu M. Phinney, both of Eugene, Ore., in August.

Deaths

Joseph Edcil Winters, New York; Medical Department of the University of the City of New York, 1872; emeritus professor of clinical medicine and pediatrics at Cornell University Medical College; formerly demonstrator and instructor of anatomy at the New York University; member of the American Pediatric Society; at one time connected with the Demilt Dispensary, Bellevue, Willard Parker, Riverside, and Columbus hospitals, New York; died in Boston, October 5, aged 74, following a long illness.

Herbert Threlkeld-Edwards ⊕ Bethlehem, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1892; member of the American Roentgen-Ray Society and the Philadelphia Roentgen-Ray Society; formerly director in the roentgen-ray laboratory, St. Luke's Hospital; said to be the developer of the first roentgen-ray intensifying screen in the United States; died, September 30, aged 52, following a long illness.

Henry Edmund Greene, Crawfordsville, Ind.; University of Michigan Medical School, Ann Arbor, 1891; member of the Indiana State Medical Society; specialized in ophthalmology, otology, laryngology and rhinology; member of the school board; formerly surgeon to the Culver Union Hospital; died, October 2, aged 55, from chronic nephritis.

John D. Anderson ⊕ Minneapolis; University of Toronto Faculty of Medicine, Toronto, Ont., Canada, 1879; L.R.C.P., Edinburgh, 1879; at one time medical director of the Royal Infirmary for Women and Children, Edinburgh; member of the British Medical Association; died, September 30, aged 67, at the Eitel Hospital, from cerebral hemorrhage.

Robert F. Palmer, Frankfort, Ind.; Hospital College of Medicine, Medical Department, Central University of Kentucky, Louisville, 1877; chief surgeon for the Toledo, St. Louis and Western Railroad; founder of the Palmer Hospital, where he died, October 2, aged 67, following a long illness.

Orin Steadman Pine, St. Paul; Bellevue Hospital Medical College, New York, 1870; Civil War veteran; formerly surgeon to the Minnesota Soldiers' Home, Minneapolis; at one time assistant city physician of St. Paul; died, October 2, aged 76, at the City and County Hospital, from heart disease.

George Grover Hatzel, New York; Long Island College Hospital, Brooklyn, 1907; member of the Medical Society of

the State of New York; formerly consulting physician to Fordham and Seton hospitals; director of the board of health; died, October 3, aged 38, from cerebral hemorrhage.

John A. Haas, Opelousas, La.; Jefferson Medical College, Philadelphia, 1882; bank president; aged 62; suffered the amputation of his foot, when both legs were broken, following the snapping of a dredge boat cable which struck him, September 27; died, September 30, in a local sanitarium.

Michael Hugh Gleason, Butte, Mont.; Chicago College of Medicine and Surgery, 1917; served in the M. C., U. S. Army, during the World War; aged 32; was drowned when the car in which he was driving plunged into the Willamette River, near Eugene, Ore., September 25.

Henry R. Hickman, St. Louis; Washington University Medical School, St. Louis, 1869; member of the Missouri Medical Association; Civil War veteran; member, and at one time president, of the school board; died, September 28, aged 83, from cerebral hemorrhage.

Hersey Goodwin Locke ✠ Syracuse, N. Y.; Medical College of Columbia College, New York, 1887; member of the American Medico-Psychological Association; professor of neuropsychiatry at Syracuse University College of Medicine; died, October 6, aged 69.

Frank Lewis Smith, Stafford Springs, Conn.; Medical Department of the University of the City of New York, 1875; member of the Connecticut State Medical Society; formerly city health officer; died, September 26, aged 73, from cerebral hemorrhage.

Robert D. Jones, Summerville, Ga.; University of Georgia Medical Department, Augusta, Ga., 1884; for ten years health officer of Chattooga County, and for eight years chairman of the board of commissioners; died, September 6, aged 68, from tuberculosis.

G. Erwin Brinckerhoff ✠ Oakland, Calif.; College of Physicians and Surgeons, Chicago, 1885; specialized in ophthalmology, otology, laryngology and rhinology; died, October 3, aged 60, at the Merritt Hospital, from angina pectoris and myocarditis.

John S. Enloe, Bay, Mo.; Hospital College of Medicine, Medical Department, Central University of Kentucky, Louisville, 1888; member of the Missouri State Medical Association; died, September 29, at St. Louis, aged 64, following a long illness.

Mitchell Fernberg, Cincinnati; Miami Medical College, Cincinnati, 1887; member of the Ohio State Medical Association; for many years district physician for the city board of health; died, September 2, at the Jewish Hospital, aged 71.

Charles H. Ansley, New Orleans; Chicago Homeopathic Medical College, 1897; specialized in ophthalmology, otology, laryngology and rhinology; died, October 3, at the Augustana Hospital, Chicago, aged 49, from pernicious anemia.

George Lee Bowne Jarvis, Coopertown, N. Y.; College of Physicians and Surgeons, Baltimore, 1892; died at the home of his sister in Riderwood, Md., September 23, aged 53, from an accidental gunshot wound of the abdomen.

I. C. Talley, Red Oak, Okla. (licensed, Oklahoma, 1908); member of the Oklahoma State Medical Association; died suddenly, September 27, at the bedside of a patient, from heart disease, aged 60.

Russell B. Marr, Filley, Mo.; Washington University Medical School, St. Louis, 1875; member of the Missouri State Medical Association; died, September 3, aged 74, from strangulated hernia, at Vernon Hospital, Nevada, Mo.

John Franklin Edgar, El Paso, Texas; Pulte Medical College, Cincinnati, 1877; formerly president of the Texas Homeopathic Medical Association; died, September 22, aged 72, from paralysis.

Wilbur Riley Thompson, Troy, Ohio; University of Michigan Medical School, Ann Arbor, 1869; member of the Ohio State Medical Association; died, October 2, aged 77, following a long illness.

Joseph Warren Letherman, Hillsboro, Ohio; Western Reserve University School of Medicine, Cleveland, 1876; formerly coroner of Highland Park; died, July 27, aged 73, from paralysis.

William R. Kennedy, Shelby, Miss.; Vanderbilt University Medical Department, Nashville, Tenn., 1900; died, September 22, aged 49, at the Baptist Hospital, Memphis, following an operation.

William Andrew Dolan ✠ Fall River, Mass.; University of Pennsylvania School of Medicine, Philadelphia, 1882; was found dead in his chair, October 1, aged 64, from heart disease.

Frank Broughton, Toledo, Ohio; Rush Medical College, Chicago, 1884; member of the Ohio State Medical Association; died suddenly, September 17, aged 62, from heart disease.

Louise C. Drouillard, Memphis, Tenn.; Northwestern University, Women's Medical School, Chicago, 1890; died, September 24, at the Baptist Memorial Hospital, Memphis, aged 62.

David William de Muralt ✠ Portland, Ore.; University of Zurich, Switzerland, 1917; formerly known as William Brunschweiler; died, September 18, aged 34, from pneumonia.

Joseph B. Laughlin, Alliance, Ohio; Starling Medical College, Columbus, Ohio, 1897; died, September 23, aged 49, at the Alliance City Hospital, from carcinoma of the liver.

Matthew Beattie, New York; Medical Department of Columbia College, New York, 1884; aged 62; died, September 19, at his home in Cornwall, from cerebral hemorrhage.

Arthur Clyde Asquith, Denver; Rush Medical College, Chicago, 1894; member of the Colorado State Medical Society; died, September 20, aged 52, from carcinoma.

Rodnia S. Plummer ✠ Topeka, Kan.; Louisville Medical College, Louisville, Ky., 1883; died, September 26, aged 72, in a local hospital, from chronic interstitial nephritis.

Edmund T. Bainbridge, Nashville, Tenn.; University of Tennessee, College of Medicine, Memphis, 1891; died, September 27, aged 75, from cerebral hemorrhage.

Robert Leroy Douglass, Rodman, S. C.; Medical College of the State of South Carolina, Charleston, 1890; died, September 13, aged 56, from cerebral hemorrhage.

John Douglas Johnson, New York; Medical Department of the University of the City of New York, 1890; died, October 6, aged 62, from heart disease.

John B. Singleton, Cincinnati; Medical College of Ohio, Cincinnati, 1891; aged 60; was found dead in his office, September 22, from heart disease.

Thomas C. Walsh, Syracuse, N. Y.; Albany (N. Y.) Medical College, 1882; died suddenly at his office, September 25, from heart disease, aged 67.

Clarence M. Brownell, Stroudsburg, Pa.; Hahnemann Medical College of Philadelphia, 1883; died, September 20, aged 63, following a long illness.

Samuel L. Van Buskirk, Philadelphia; Jefferson Medical College, Philadelphia, 1887; died, September 27, aged 58, following a long illness.

Cyrus Oscar Callison, Holly, Colo.; University of Colorado School of Medicine, Denver, 1911; died, September 24, aged 41, from heart disease.

Samuel E. Wertman ✠ Mahanoy City, Pa.; Jefferson Medical College, Philadelphia, 1889; died, September 29, aged 55, from chronic nephritis.

James Florus Huntley ✠ Oneida, N. Y.; Medical Department of the University of the City of New York, 1877; died, September 19, aged 67.

Le Verne A. Badger, Toledo, Ohio; University of Buffalo, Department of Medicine, 1875; died, September 25, aged 76, from heart disease.

William Everett Davis, Springfield, Mass.; International Electropathic Institution, Mentor, Ohio, 1887; died, September 29, aged 57.

Ira N. Bishop, Brunswick, Ga.; Miami Medical College, Cincinnati, 1874; died, September 22, aged 70, at the Brunswick Hospital.

Charles E. Johnson, Sherman, Texas; Pulte Medical College, Cincinnati, 1881; died, September 23, aged 71, from dengue fever.

Flavius J. Greer, Wolbach, Neb. (licensed, Nebraska, 1891); formerly a druggist; died, September 26, aged 82, from senility.

Guy Henry Horwell, Cleveland; Homeopathic Hospital College, Cleveland, 1890; died suddenly, September 23, aged 58.

Clara M. Moore, Denver; University of Colorado School of Medicine, Denver, 1897; died, September 26, aged 51.

John W. Bright, Philadelphia; Jefferson Medical College, Philadelphia, 1880; died, September 22, aged 68.

Walla M. Kirk, Boon, Miss. (licensed, Mississippi, 1908); died recently, aged 76, at Clayton, from ascites.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE JOURNAL'S BUREAU OF INVESTIGATION, OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER GENERAL MATERIAL OF AN INFORMATIVE NATURE

CLEARO

A Fraudulent Consumption Cure Is Debarred from the Mails

"Clearo" was a "patent medicine" sold on the mail-order plan by one C. E. McCuistion, 612 Woodin Boulevard, Dallas, Texas, who did business under the trade name "The Clearo Company." McCuistion claimed that, when a young man, he was afflicted with tuberculosis and was cured by a simple herb medicine prepared by the Choctaw Indians. He claimed to have discovered what this herb was and how it was prepared and to have greatly improved the preparation. In the advertising matter, consisting of booklets, pamphlets and circulars, Clearo was held out as a cure for tuberculosis, asthma, bronchitis, hay fever and serious throat and lung troubles. Of course, the composition of Clearo was kept secret and the whole tenor of the representations made with respect to it was calculated to deceive persons into believing that Clearo had some mysterious virtues not possessed by other known drugs. These facts and the information that follows are contained in the memorandum of Judge John H. Edwards, Solicitor to the Post Office Department, in his memorandum to the Postmaster-General under date of June 23, 1922.

On April 21, 1922, the Clearo Company was ordered by the Post Office Department to show cause on or before May 16, why a fraud order should not be issued against it. No one connected with the concern appeared on the date named, nor was it represented by an attorney, but a written answer was filed by W. H. Hall of Dallas on behalf of the Clearo Company.

The postal authorities submitted specimens of Clearo to the Bureau of Chemistry for analysis and Dr. L. F. Kebler, Chief of the Drug Division of that Bureau, filed a report of the results of the examination of the preparation. According to Dr. Kebler, Clearo was an amber-colored, bitter liquid, containing over 98 per cent. water and alcohol with a trace of other volatile matter. The nonvolatile matter comprised only 1.92 per cent. of the total. The preparation contained traces of tannin and bitter plant principles, but no potent alkaloids. McCuistion claimed that part of the virtues of his nostrum resided in the volatile matter, but, as Dr. Kebler pointed out, the amount of volatile oil was a negligible quantity and could not possibly have any effect on the diseases set forth in the printed matter describing Clearo. The report showed that Clearo was of no value whatever in the treatment of tuberculosis.

In the written answer filed on behalf of the Clearo Company by W. H. Hall there was a copy of what purported to be a report and chemical analysis made of the alleged "Indian herb" said to be used in Clearo by one A. C. Herting of Camden, N. J., who styled himself "General Industrial, Experimental, Pharmaceutical, Bacteriological, Physiological, Analytical and Research Chemist." This "report" showed that the preparation contained tannin but admitted that it "contained no other medicinal constituents."

Judge Edwards' memorandum further states that the evidence showed that McCuistion personally compounded Clearo, although it failed to show that this man had ever had any training along medical lines such as to qualify him to engage in such work. The memorandum reproduces, as written, a letter from McCuistion from which it is obvious that the man "has very little education." In summing up the case against McCuistion, Judge Edwards says:

"The evidence shows that McCuistion is not in any way qualified to undertake the treatment of diseases that baffle the skill of the most expert medical scientists; that he has not discovered anything new or useful in the way of medicine, but that this is just another of the many schemes that have been devised by unscrupulous mail-order promoters whereby persons suffering from dangerous diseases have been induced, by means of cleverly worded representations, to rely on such mail-order treatment, and thus lose precious time in obtaining proper treatment."

As a result of this investigation the Solicitor recommended that the Postmaster-General issue a fraud order against the Clearo Company because the concern was engaged in a "scheme for obtaining money through the mails by means of false and fraudulent pretenses, representations and promises." The fraud order was issued July 18, 1922.

Correspondence

CAPPER'S WEEKLY AND THE GREAT AMERICAN FRAUD

To the Editor:—An editorial appeared in the Fairmont (Minn.) *Daily Sentinel* for October 6 criticizing *Capper's Weekly*, the personal organ of Senator Arthur Capper from Kansas. On reading the senator's publication, one is shocked at the class of the medical advertising contained therein. Here is part of the *Sentinel's* editorial:

But our chief grievance against Senator Capper is not as a statesman and a legislator, but as a newspaper publisher and proprietor.

Capper's Weekly, Senator Capper's own personal organ, claims a circulation of 700,000. Senator Capper writes extensively for every issue, and it is touted as "a Champion of Human Welfare and the Square Deal." A recent issue before us contains a lengthy article, over a facsimile of the senator's signature, in which he expresses deep concern for boys and girls, and in chaste and beautiful English, gives advice which he hopes will save them from the allurements of a giddy life and impress them with the importance of studious self-denial and rectitude of conduct.

But in the same paper containing saintly precepts and homilies on right living, what de wo find?

Column after column of the vilest, lowest, beastliest, most misleading, deceptive, dishonest and debauching advertisements of nostrums and alleged cures of diseases that are contained in any paper in the United States that is permitted to circulate through the mails.

There isn't a publisher in Minnesota so unscrupulous and grasping as to consider for a second any one of more than fifty advertisements that disgrace Senator Capper's paper and that have defiled its columns for more than a year.

The medicines and cure-alls that are advertised are grossly and cruelly false and delusive and have been black-listed and discredited by every reputable physician in the country.

They appeal only to the poor and ignorant, suffering from maladies which skill and science and accredited diagnosticians are competent to deal with.

Senator Capper is selling his name and fame to the dirty scoundrels who advertise these discredited concoctions which not only do no one a particle of good, but inflict upon the victims habits and appetites that inevitably lead to ruin and disgrace.

We declare in all earnestness that the class of advertising which the Capper paper contains should not only exclude it from the United States mails, but should ostracize it and its publisher from every respectable household. Any one who questions this statement is requested to procure a copy of the Capper paper and submit the advertisements it contains to a reputable physician.

According to the published rates of *Capper's Weekly* these advertisements bring Senator Capper a handsome fortune every month. What it brings the deluded victims would hardly dovetail with the paper's motto: "A Champion of Human Welfare."

This paper has no objection to Senator Capper's coming to our state to preach pure politics, but a man who is most shamefully and brazenly humbugging his innocent and confiding patrons is not entitled to the respect and consideration of honest voters.

The *Daily Sentinel* has for years refused such advertising as is referred to above and, to my knowledge, has turned down contracts that have amounted to thousands of dollars.

R. C. HUNT, M.D., Fairmont, Minn.
Secretary, Blue Earth Valley Medical Society.

[COMMENT.—The caustic comments of the Fairmont *Daily Sentinel* caused us to purchase some recent issues of *Capper's Weekly*. Cures for cancer, epilepsy, goiter, piles, asthma, the whisky habit, "rheumatism," baldness and rupture; "weak men" cures, a "Vacuo-Invigorator" ("instrument sent in plain wrapper") the "Bee Cell" uterine "supporter"—these are but a few of the fakes featured in this self-styled "National

Weekly of a Great Nation." According to the editorial page, *"Capper's Weekly* stands for a square deal for all"—and then advertises that if diabetics take "Eksip" they do not need to diet! *"Capper's Weekly* stands for making prohibition world-wide"—and advertises nostrums whose most potent ingredient is alcohol and containing from 15 to 18 per cent. of this ingredient! *"Capper's Weekly* stands for laws to prevent price gouging"—and advertises a nostrum, for making childbirth easier, containing a few cents' worth of oil and selling for a dollar and a quarter! *"Capper's Weekly* stands for the stripping of waste" from the public service—and perpetuates the most monstrous form of waste known to modern civilization, that of the iniquitous "patent medicine," and obtains no small proportion of its advertising receipts from such perpetuation.—Ed.]

DIAGNOSIS OF SYPHILIS FROM PRIMARY LESION

To the Editor:—There is a simpler and, I believe, no less efficient method of securing material from a syphilitic lesion for microscopic examination than that described by Dr. William D. Gill in The Journal, September 16, and that of Dr. J. B. H. Waring, described September 30. This method, which I have used and found satisfactory, is merely to use a test tube of appropriate size as a dry cup. The lesion is washed with water, and the surrounding skin left moist to secure adhesion. The dry tube, firmly held at its open end, is thoroughly heated and so applied immediately that its rim is in contact with the skin around the edges of the lesion. When the lesion is on the penis, the patient assists by drawing the skin taut with his thumbs, while his index fingers make counterpressure on the under surface of the organ. One may watch the result through the glass, and terminate it when a sufficient amount of serum has gathered or blood exudes. To obtain the secretion, a capillary tube is helpful. It is so drawn that one end is slightly expanded. The material is taken up into the narrow end; and while this is held over a slide, the expanded end is held in the flame until it fuses. The heated air within will then force the serum upon the slide. The tube should be about 4 inches (10 cm.) long.

Melville Silverberg, M.D., San Francisco.

Queries and Minor Notes

Anonymous Communications and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

TYPHOID VACCINATION BY MOUTH

To the Editor:—I am enclosing a clipping for comment. Typhoid and paratyphoid are quite common here, and it would be interesting to know whether there is any virtue in this article.

C. E. Jumper, M.D., Torreón, Coahuila, Mexico.

Answer.—The clipping purports to describe the extensive trials of Besredka's method of vaccination by mouth recently made in the region of Neuvireuil and Frémicourt in northern France, where typhoid was epidemic. This work was described in detail by Vaillant in the *Annales de l'Institut Pasteur* (February, 1922, p. 249), and reviewed by Besredka in the *Paris médical* (June 3, 1922, p. 463; abstr. The Journal, July 8, 1922, p. 165). Out of a total population of 2,000, 1,236 were inoculated against typhoid by the mouth with Besredka's *vaccin bilié;* 173 were vaccinated subcutaneously, and between 600 and 650 remained unvaccinated. Among the unvaccinated, 7.7 per cent. contracted typhoid fever, and 2.3 per cent. among those inoculated subcutaneously. Among the vaccinated by mouth, three developed the disease while vaccination was still in progress or immediately afterward, and two, or 0.17 per cent., ten days after completing the vaccination. Besredka's bile vaccine consists of a pill of bile and a tablet containing a mixture of heat-killed typhoid and paratyphoid bacilli. These are taken three mornings in succession. Besredka states that this first trial of antityphoid vaccination by mouth was very encouraging. Dopter (*Paris médical,* June 3, 1922, p. 454), while granting that much, adds that it is for the future to determine whether the method has value.

HEMORRHAGIC MALARIA

To the Editor:—Will you be kind enough to explain: 1. What is the place assigned to the term "hemorrhagic malaria" in nosology? 2. In case there is such a disease, may it be mistaken for yellow fever?

X Y Z., Mexico.

Answer.—1. In the "Manual of the International List of Causes of Death" (Washington, 1922), "Hemorrhagic Malaria" is listed as one of the subheadings of the general title "Malaria." It is generally discussed in textbooks in the chapter on malaria, and is classified as blackwater fever, hemoglobinuric fever and malarial hemoglobinuria under the general heading of "Hemorrhagic Forms."

2. In the early stages of an epidemic of yellow fever, cases may be mistaken for malarial fever. The absence of early jaundice should be noted, as the color of the skin is rarely changed within four or five days, even in the most intense types of malarial infection. In hemorrhagic malaria the patient has usually had previous attacks of malaria. Hematuria is a prominent feature, while in yellow fever it is not frequent. Of course, examination of the blood for malarial parasites provides conclusive evidence.

Carter (Supplement 19 to *Public Health Reports,* Sept. 11, 1914) adds:

> The differential diagnosis for malaria is, as a rule, fairly easy. Only do not lay too much stress on the plasmodia. If you do not find any plasmodia and the patient has not taken quinin, negatively the sign is of great value. Finding the plasmodium does not exclude yellow fever. . . . The time of onset is of some value. If the chill comes on in the night it is pretty certain not to be malaria, but if it comes in the daytime it does not exclude yellow fever. The facies is distinct from malaria. A man would be unwise to make a diagnosis on the facies in the first stage, although he ought to be able to say that it was not malarial fever, and if malarial fever were the only alternative he would certainly be suspicious of yellow fever and count it yellow fever from a sanitary aspect. The first year I was in Habana, Major Gorgas and I used to go over to Cabañas early every morning to look over the sick people in the barracks there, and we used to write out the diagnoses of the men as we saw them. We saw, then, in the morning those who sickened in the night, within the first twelve hours of illness, so practically our guide was the facies. We were mistaken quite often, but rarely between yellow fever and malarial fever. Malarial fever plus alcoholism was less easy to differentiate from yellow fever.

ARSENAURO

To the Editor:—Can you give me any information on a proprietary preparation called Arsenauro, manufactured by Parmele Pharmical Company of New York? In handling a good many diabetics, I occasionally find one who has been taking this drug from recommendations of questionable source, in some instances to what I have thought was their detriment decidedly. The label on the bottle gives no information as to its formula, and directions are very indefinite, namely: "Take to the point of saturation."

Any information you can give me will be appreciated.

L. H. Fuson, M.D., St. Joseph, Mo.

Answer.—Arsenauro was widely advertised and had considerable vogue at one time. The preparation is similar in composition to "solution of gold and arsenic bromid," of the National Formulary. This contains bromid of gold (hydrogen bromaurate, $HAuBr_4$ and arsenic acid H_3AsO_4). Gold preparations were at one time believed to have therapeutic value, particularly as "alteratives." They have, however, proved inefficient and have been generally discarded. No preparation of gold has been admitted to "Useful Drugs" by the Council on Pharmacy and Chemistry, and we know of no good evidence that gold compounds are of value in the treatment of diabetes.

All Together.—Work falls flat, play and art become sterile, love and worship become conventional, unless there is originality, personal creation in each. I must do my job in my own way, find an individual outlet in the symbols of art or game, and an individual answer in love and prayer if I am to feel at home in the world. Yet this individual note is no cry in the void, because it claims brotherhood with all future and distant notes.—(Cabot, R. C.: What Men Live By, Boston, Houghton, Mifflin Company, 1914.)

Medical Education, Registration and Hospital Service

COMING EXAMINATIONS

ARKANSAS: Little Rock, Nov. 14-15. Sec., Reg. Bd., Dr. G. W. Walker, Fayetteville; Sec., Eclec Bd., Dr. C. E. Laws, 803½ Garrison Ave., Fort Smith; Sec., Homeo. Bd., Dr. George M. Love, Rogers.

CONNECTICUT: Hartford, Nov. 14-15. Sec., Reg. Bd., Dr. Robert L. Rowley, 79 Elm St., Hartford.

CONNECTICUT: New Haven, Nov. 14-15. Sec., Eclec. Bd., Dr. James E. Hair, 730 State St., Bridgeport; Sec., Homeo. Bd., Dr. Edwin C. M. Hall, 82 Grand Ave., New Haven.

IOWA: Des Moines, Nov. 1-3. Sec., Dr. Rodney P. Fagen, State House, Des Moines.

MAINE: Portland, Nov. 14-15. Act. Sec'y., Dr. Adam P. Leighton, Jr., 192 State St., Portland.

MASSACHUSETTS: Boston, Nov. 14-16. Sec., Dr. Samuel H. Calderwood, 144 State House, Boston.

MISSOURI: Kansas City, Nov. 20-23. Sec., Dr. Cortez F. Enloe, State House, Jefferson City.

NEBRASKA: Lincoln, Nov. 6-8. Sec., Mr. H. H. Antles, Capitol Bldg., Lincoln.

NEVADA: Carson City, Nov. 6. Sec., Dr. Simeon L. Lee, Carson City.

OHIO: Columbus, Dec. 6-8. Sec., Dr. H. M. Platter, Hartman Hotel Bldg., Columbus.

TEXAS: Waco, Nov. 28-30. Sec., Dr. T. J. Crowe, Dallas County Bank Bldg., Dallas.

VIRGINIA: Richmond, Dec. 5-8. Sec., Dr. J. W. Preston, McBain Bldg., Roanoke.

TUBERCULOSIS DISPENSARIES AND CLINICS IN THE UNITED STATES

Second Instalment of Dispensary Data Presented by the Council on Medical Education and Hospitals of the American Medical Association

The survey of dispensaries and clinics recently conducted by the Council on Medical Education and Hospitals has made possible the collection not only of the mass of data regarding general dispensaries which appeared in THE JOURNAL, Aug. 5, 1922, on Dispensary Service in the United States, but also much information in regard to special dispensaries and clinics, including a complete list[1] of tuberculosis clinics. This list includes not only the dispensaries operated solely for tuberculous patients, but also the departments of general dispensaries, whether connected with a hospital or not, in which special staffs and separate hours are set apart for the care of such patients. Where a hospital or general dispensary is named in the list, therefore, it is to be understood that the institution has been reported as maintaining an organized service for ambulant tuberculous patients.

TABLE 1.—WORK DONE BY TUBERCULOSIS CLINICS

	Number Clinics Reporting	Total Patients	Total Visits	Patients per Clinic	Visits per Clinic	Average Number Visits per Patient
Clinics for tuberculosis only....	392	230,779	915,299	589	2,335	4
Tuberculosis clinics in general dispensaries ...	137	48,697	167,395	355	1,222	3.4
Total	529	279,476	1,082,694	528	2,047	3.9

The list published contains the names of the 888 tuberculosis dispensaries and clinics which were known to exist at the time we went to press—twenty-five more than were recorded, Aug. 5, 1922. Reports of others are continuing to come in, but these, as a rule, are newly organized institutions. We believe, therefore, that the list is complete.

As shown in Table 1, of the 888 tuberculosis dispensaries recorded, definite reports have been received from 529, giving the total number of patients cared for during the last calendar year and the total number of visits made by those patients in that year. Altogether, the 529 dispensaries which sent in reports were visited by a total of 279,476 different persons last year, who in that time made 1,082,694 visits to the dispensaries, or an average of approximately 4 visits by each person. On the average there were 528 patients to each dispensary, who made during the year 2,047 visits. Applying this average to the 329 dispensaries from which definite reports were not received, there is an estimated total of 468,864 persons cared for by the 888 dispensaries who, during the year, made a total of 1,817,625 visits.

These figures represent persons rather than patients. They include a large majority who on examination were found to be nontuberculous. In fact, the proportion who were tuberculous represents only 20 or 25 per cent. of all persons examined.

1. The list of tuberculosis dispensaries in the United States, which is omitted here for lack of space, may be obtained from the Council on Medical Education and Hospitals on receipt of 6 cents for postage.

TABLE 2.—TUBERCULOSIS CLINICS IN THE UNITED STATES

State	Population 1920	No. of Tbc. Clinics	State	Population 1920	No. of Tbc. Clinics
Alabama	2,348,174	5	Nebraska	1,296,372	3
Arizona	334,162	5	Nevada	77,407	..
Arkansas	1,752,204	5	New Hampshire.	443,083	31
California	3,426,861	31	New Jersey.....	3,155,900	52
Colorado	939,629	8	New Mexico.....	360,350	1
Connecticut	1,380,631	30	New York.....	10,385,227	118
Delaware	223,003	5	North Carolina..	2,559,123	7
Dist. of Colum..	437,571	4	North Dakota...	646,872	..
Florida	968,470	4	Ohio	5,759,394	28
Georgia	2,895,832	4	Oklahoma	2,028,283	4
Idaho	431,866	.	Oregon	783,389	1
Illinois	6,485,280	76	Pennsylvania ...	8,720,017	123
Indiana	2,930,390	42	Rhode Island....	604,397	12
Iowa	2,404,021	15	South Carolina..	1,683,724	1
Kansas	1,769,257	7	South Dakota....	636,547	..
Kentucky	2,416,630	13	Tennessee	2,337,885	7
Louisiana	1,798,509	4	Texas	4,663,228	9
Maine	768,014	5	Utah	449,396	..
Maryland	1,449,661	19	Vermont	352,428	1
Massachusetts ..	3,852,356	86	Virginia	2,309,187	16
Michigan	3,668,412	31	Washington	1,356,621	10
Minnesota	2,387,125	8	West Virginia...	1,463,701	3
Mississippi	1,790,618	2	Wisconsin	2,632,067	21
Missouri	3,404,055	27	Wyoming	194,402	..
Montana	548,889	4	Totals	105,710,620	888

The comparatively low number of visits to tuberculosis clinics, as compared with the visits made by patients to general dispensaries, is accounted for as follows: (*a*) The majority of those examined are found to be nontuberculous and, therefore, do not return to the clinics; (*b*) many of those who are found to be tuberculous are referred back to their private physicians for treatment, and (*c*) in cases of tuberculosis, as a rule, fewer visits are necessary, as compared with general diseases.

It is interesting to note in Table 1 that the 329 dispensaries for tuberculosis cared for an average of only 589 patients each during the year, whereas each of the 137 tuberculosis clinics which were connected with general dispensaries cared for only 355 patients on the average. There are some general dispensaries which do not treat tuberculous patients, but refer them to the special clinics.

The distribution of clinics by states is shown in Table 2. The population of each state is also given. It might be expected that the state having the largest population would have also the largest number of clinics, but this is not essentially true. Although New York has the largest population, it has the second largest number of clinics, having 118 as compared with 123 in Pennsylvania, which is the second state from the standpoint of population. Massachusetts occupies the third place, with 86 clinics, followed by Illinois with 76, Indiana with 42, California, Michigan and New Jersey each with 31, and Connecticut with 30. The interest of the people of the respective states in regard to the care of tuberculous patients would be better shown if the total number of patients cared for in each state could be given. With the further improvement and stabilization of record systems, it is certain that more accurate statistics regarding the service rendered by tuberculosis dispensaries and clinics can be obtained.

The distribution of tuberculosis dispensaries in the fifty largest cities is shown in Table 3. New York, the largest city, leads with forty-eight clinics. St. Louis has the second largest number of clinics, twenty-two, although it is the sixth city from the standpoint of population. It is interesting to note that of the 888 dispensaries and clinics, only 242, or 27 per cent., are found in these largest cities. Here again, however, it is not so much the number of clinics as it is the

number of patients cared for that should be considered—information not now available. Undoubtedly the 242 clinics in the largest cities care for larger numbers of patients on the average than do the 646 clinics located in smaller centers of population.

The distribution of dispensaries by districts or groups of states is shown in Table 4. It will be noted that the North Atlantic states have the largest number, 458, followed by the North Central group, with 258. The South Central group has the smallest number, forty-nine, while the Western group of states, although having a smaller population, has sixty clinics.

TABLE 3.—TUBERCULOSIS CLINICS IN THE FIFTY LARGEST CITIES

Cities	Population 1920	Tuberculosis Clinics	Cities	Population 1920	Tuberculosis Clinics
New York	5,621,151	48	Providence, R. I.	237,595	6
Chicago	2,701,705	16	Columbus, Ohio	237,031	1
Philadelphia	1,823,779	19	Louisville, Ky.	234,891	1
Detroit	993,739	9	St. Paul	234,080	1
Cleveland	796,836	9	Oakland, Calif.	216,361	1
St. Louis	773,000	22	Akron, Ohio	208,435	3
Boston	747,923	7	Atlanta, Ga.	200,616	1
Baltimore	733,826	9	Omaha	191,601	1
Pittsburgh	588.193	4	Worcester, Mass.	179,741	2
Los Angeles	575,480	5	Birmingham, Ala.	178,270	1
San Francisco	506,676	10	Richmond, Va.	171,667	2
Buffalo	505,875	8	Syracuse, N. Y.	171,647	1
Milwaukee	457,147	4	New Haven, Conn.	162,390	3
Washington, D. C.	437,414	4	Memphis, Tenn.	162,351	1
Newark, N. J.	414,216	1	San Antonio, Tex.	161,379	1
Cincinnati	401,158	2	Dallas, Tex.	158,976	2
New Orleans	387,408	3	Dayton, Ohio	152,559	1
Minneapolis	380,582	3	Bridgeport, Conn.	149,152	3
Kansas City, Mo.	324,410	3	Houston, Tex.	138,276	1
Seattle	315,652	3	Hartford, Conn.	138,036	1
Indianapolis	314,194	6	Scranton, Pa.	137,700	1
Jersey City, N. J.	297,864	2	Gr'd Rap's, Mich.	137,634	1
Rochester, N. Y.	295,750	1	Paterson, N. J.	135,866	1
Portland, Ore.	258,288	1	Youngstown, Ohio	132,358	1
Denver	256,369	3			
Toledo, Ohio	243,164	1	Totals	25,381,011	242

Tuberculosis dispensaries and clinics are rapidly increasing in number, which indicates that they are an important factor in the increasingly vigorous efforts being made to stop the ravages of this disease. Besides their service in connection with the diagnosis and treatment of tuberculosis, they are proving to be an excellent factor in the education of the public in the ways of prevention and cure. This work is aided largely by traveling clinics and by visiting nurses and social workers through whom there is a contact with tuberculous persons who remain at home. Practically all clinics have been fostered by or are affiliated with some active antituberculosis organization.

TABLE 4.—TUBERCULOSIS CLINICS BY DISTRICTS

	Population, 1920	No. of Tbc. Dispensaries
North Atlantic States	29,662,053	458
South Atlantic States	13,990,272	63
North Central States	34,019,792	258
South Central States	19,135,531	49
Western States	8,902,972	60
Totals	105,710,620	888

In addition to the dispensaries or clinics regularly conducted at permanent locations, there are in most states varying types of traveling or itinerant clinics conducted by one or more experts in tuberculosis sent out by the state board of health or some other central organization. Such clinics are usually held at regular intervals in different counties or districts of the state, but not always in the same towns in these districts.

Reports from state medical societies, state boards of health and antituberculosis organizations indicate that there is an increasingly effective cooperation between local antituberculosis activities and other local civic and state organizations interested in other lines for improving public health. The expense of maintaining clinics is being increasingly shared by the general public of each community through the sale of Christmas seals and other methods of raising funds.

Among the agencies that have cooperated heartily with us in the survey of tuberculosis dispensaries and in furnishing data are the individual clinics themselves, the hospitals and general dispensaries which conduct special clinics for tuberculous patients, the federal, state and city departments of health, and the National Tuberculosis Association, including its branch state and county organizations. To all these organizations, acknowledgments are due for the excellent assistance rendered, and in the furnishing of information without which the publication of these data would have been impossible.

Social Medicine

THE CALIFORNIA ANTIVIVISECTION INITIATION MEASURE

Statement Issued by the Regents and President of the University of California, and the Board of Trustees and President of Stanford University, Opposing the Measure

The advance of sanitation, modern medicine and physiology, nutrition, the teaching of biology and the protection of our industries and agriculture all rest on animal experimentation. The control of the epidemic diseases of man and of animals, the management of surgical operations and of childbirth and the certification of milk, food and water supplies would be impossible without the knowledge gained by such studies. In fact, the present day protection of the public from diseases, which is vital to our community life, rests on animal experimentation. The University of California and Stanford University are vitally interested in the defeat of this initiative measure, since its passage would be a statewide calamity.

Not only would it stop the research work now going on in the medical schools, hospitals and laboratories and in the Bureau of Animal Industry, but it would damage the market for most of California's food products, and markedly reduce the confidence of visitors coming into the state. If California could not certify to its food and water supplies, could not guarantee protection against contagious diseases, could not provide certified milk, the effect on agriculture and industry in the state would be disastrous. The near collapse of the olive industry, due to the poisoning of a few people in eastern states, and the way in which the industry was saved by the researches carried on in the laboratories of the two universities, indicate the imperative necessity of freedom for the universities in animal experimentation. California food, instead of being looked to as an example of purity, would be shunned.

The initiative measure would make it impossible to test with birds for deadly gases in the mines of the state. It would stop the manufacture of serum for the prevention of hog cholera, the preparation of vaccine for anthrax, and the various other products that are required for the protection of our industries in agriculture and that annually save millions of dollars and prevent great mortality among domestic animals. Under the act, operations on various farm animals could be carried on without anesthetics to increase the palatability of foods, but no animals could be used in experimental work if the information obtained is for the benefit of a person or of the human race.

We feel that no worse attack on the welfare of the state and on the right of the universities to seek and teach the truth could be made. Every man, woman and child, every unborn babe, every domestic animal in the state would be affected if this measure becomes a law. It strikes at all.

It is unnecessary special legislation, due to prejudice and misinformation. No one will tolerate cruelty to animals. The present laws of the state are drastic and sufficient to control any abuse. We know that there is no cruelty to animals in the laboratories of the universities. They are in charge of men and women of the highest character who are unselfishly working to better the lot of their fellow men and to advance the interests of their community and of the state. Anesthetics are always used for animals in the laboratory in exactly the same way that they are used by surgeons in the operating rooms.

We urge upon the citizens of the state the imperative necessity of defeating this initiative measure.

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA,
by DAVID P. BARROWS, President of the University.

THE BOARD OF TRUSTEES OF STANFORD UNIVERSITY,
by RAY LYMAN WILBUR, President of the University.

Book Notices

LES MALADIES PARASITAIRES DES PLANTES. (Infestation-Infection). Par M. Nicolle et J. Magrou (de L'Institut Pasteur). Paper. Price, 8 francs net. Pp. 199. Paris: Masson et Cie, 1922.

This small volume scans the phenomena of phytopathology from a rather unusual point of view, that of general pathology, and seeks to throw light on the actual cause of disease as occurring in both plants and the higher and lower animals. So concise is the writing that a much greater mass of detailed information is recorded than might be expected in so few pages. Forty-three pages are given to the consideration of plant diseases caused by insects and nematodes; twelve pages to those caused by phanerogams; fifty-five pages to those due to fungi, and thirty-one to those caused by bacteria; while twenty-four pages are devoted to the general consideration of parasitic diseases of plants. The general plan is to present for each group, first, a brief enumeration of the principal diseases; the symptoms and mechanism of infection, and the causal organisms. Generalizations are made at the end of each group, and broader generalizations in the concluding chapter. Several conceptions not frequently encountered in books on plant disease are represented by the terms "predateurs," "spoliateurs," "phytophages," "distructeurs" and "cocidiogenes" as applied to the insects. Concise discussion, or rather enumeration, is also made of the "sensibité," means of resistance, means of attack, prophylaxis, virulence, irritation resulting in hypertrophy and hyperplasia. The material on which the discussions are based is, in general, well selected, though the enumerations are far from exhaustive. A few inconsistencies of nomenclature are to be noted. French literature is drawn upon much more freely than is American literature, and certain recent advances in knowledge are unmentioned. As a whole, the book presents the material in systematic, concise form, and with discussion from a new and welcome point of view.

INFLUENZA: ESSAYS BY SEVERAL AUTHORS. Edited by F. G. Crookshank, M.A., F.R.C.P., Physician, The Prince of Wales' General Hospital. Cloth. Price, 30 shillings net. Pp. 528. London: William Heinemann, 1922.

It is difficult to characterize this book in a few words. A large amount of industry has gone into the compilation, the bibliography alone of the chapter on bacteriology occupying more than sixteen pages. But the discussion of the data is so warped and twisted by a preconceived notion that the addition made by the book to current medical thought cannot be said to be very valuable. The central thesis, as would be expected by those who know the writings of Crookshank, Hamer and some other English authors, is so colored by belief in an identical "epidemiological constitution" for influenza, epidemic meningitis, epidemic encephalitis and botulism that it is hard to be altogether patient. The character of much of the theoretical speculation may be illustrated by a single sentence: "The epidemiological liaison between the 'grip,' the pneumonia and the 'poliomyelitis' was completely missed; and many cases of the nature that now provokes the name 'encephalitis lethargica' were on the Pacific coast diagnosed as 'botulism' and ascribed, in the most light-hearted fashion, to the consumption of canned tomatoes and beans, as is set forth in Dickson's monograph." This is the sort of book whose authors complain about neglect and indifference on the part of the mass of their scientific contemporaries.

A PRACTICAL MEDICAL DICTIONARY OF WORDS USED IN MEDICINE WITH THEIR DERIVATION AND PRONUNCIATION, INCLUDING DENTAL, VETERINARY, CHEMICAL, BOTANICAL, ELECTRICAL, LIFE INSURANCE AND OTHER SPECIAL TERMS; Anatomical Tables of the Titles in General Use, and Those Sanctioned by the Basle Anatomical Convention; Pharmaceutical Preparations, Official in the U. S. and British Pharmacopeias and Contained in the National Formulary; Chemical and Therapeutic Information as to Mineral Springs of America and Europe, and Comprehensive Lists of Synonyms. By Thomas Lathrop Stedman, A.M., M.D. Seventh edition. Leather. Price, $7 net. Pp. 1144, with illustrations. New York: William Wood & Co., 1922.

In this edition, the compiler states, between four and five hundred new words have been added, but an increase in size has been avoided by expunging obsolete terms and shortening definitions. Several new plates have been added, and all of the plates have been grouped at the end of the volume.

FORTY NOTIFIABLE DISEASES. A Simple Discussion of the More Important Communicable Diseases. By Hiram Byrd, B.S., M.D., Director, Department of Hygiene, University of Alabama. Paper. Price, 60 cents. Pp. 74. Yonkers-on-Hudson: World Book Company, 1922.

This booklet for the public is written in clearly understandable language—actually American language. The information given in general is accurate. The author accepts the discoveries of the organisms of poliomyelitis and of yellow fever made in the Rockefeller Institute as established, although there is still some doubt on this point. Its quality makes the pamphlet well worth the very reasonable price at which it is sold.

Medicolegal

Liability of Physician Negligently Cutting Tongue

(Hague v. Threadgill (Mo.), 236 S. W. R. 895)

The St. Louis (Mo.) Court of Appeals, in affirming a judgment for $2,000 damages in favor of the plaintiff, an infant, says that, because of defective hearing, he was taken to the defendant, a practicing physician, and the latter was employed to perform an operation for the removal of the tonsils and adenoid tissue. During the operation, the defendant was assisted by his son, a medical student, who administered the anesthetic. There was considerable difficulty experienced in keeping the boy under the influence of ether, and there was evidence that the supply of it gave out, after which chloroform was used. The plaintiff's mother testified that after the defendant began operating the boy was bleeding profusely and the defendant called her and said that he had made an awful mistake, and had cut the boy's tongue; that he could not work very much because the boy was bleeding too much; that the clamp slipped and cut the boy's tongue. The boy's father testified that later on in the day the defendant stated to him: "Well, that was an awful mistake; that was the mistake of my life; I would not have it happen again for anything on earth." A specialist in diseases of the ear, nose, and throat, who had performed like operations several thousand times, testified that he had never found it necessary to cut the tongue, and had never done so. The defendant admitted that the tongue was cut during the operation, but contended that it was a pure accident, which occurred when it became necessary to remove the tongue quickly from the boy's throat after the boy had swallowed it while under the anesthetic, and such action was necessary in order to save the boy's life. The defendant denied that he made the admissions testified to by the boy's parents, and said that what he had showed to the mother was adenoid tissue, while in the

evening, when he recognized that the tongue was injured, he told her that he was always sorry that such things occurred; that he was sorry the condition was there, but they had to do it to save the boy's life.

The plaintiff's evidence, the court thinks, was sufficient to make the question of the defendant's negligence one for the jury. The admission testified to by the plaintiff's witness to the effect that the defendant had made an awful mistake in cutting the boy's tongue, was something more than a conclusion, as argued by the defendant's counsel. It was an admission of a fact, namely, that the defendant had cut the plaintiff's tongue, and that in doing so he had made a mistake. This testimony, and the fact that the evidence further showed that thousands of operations of like character were performed without injury to the patient's tongue, was sufficient to authorize the jury to infer that the defendant was guilty of negligence. While it was true, as contended by the defendant's counsel, that the defendant should not be held liable for a mere error of judgment, the evidence was sufficient to support a finding by the jury to the effect that the defendant had blundered and was negligent in the performance of the operation.

An instruction, after telling the jury that the terms "carelessly" and "negligently" did not imply lack of skill or capacity, told the jury that, even though they believed the defendant possessed all of the qualifications to be a competent and skilled physician and surgeon, yet if it was proved that he was careless and negligent in performing the operation described, as carelessness and negligence were defined in the instructions, and through such carelessness and negligence the plaintiff's tongue had been permanently injured and disfigured, then the mere fact that the defendant may have been competent and skilful constituted no defense to this action. As there was no evidence of any other act of negligence than the one charged, the court does not think that the jury could have been led astray or afield by the form of the instruction, which it was argued was broader than the charge in the petition. Nor does the court think that there was any merit in the contention that another instruction was erroneus in permitting the plaintiff to recover for an injury to his body, when the charge in the petition was an injury to his tongue; for a person's tongue is necessarily a part of his body, and here it was the only part of the body alleged to be or shown to have been injured.

Refusal of Plaintiff to Take Laughing Gas

(Mackay Telegraph-Cable Co. v. Armstrong (Tex.) 241 S. W. R. 795)

The Court of Civil Appeals of Texas, in affirming a judgment for $2,500 damages in favor of plaintiff Armstrong for a permanent injury to his knee sustained in the employ of the defendant company, says that the defendant sought to compel the plaintiff to take "laughing gas" in order that in the presence of the jury he might, while unconscious, be examined. The plaintiff refused to be put under the influence of an anesthetic to be examined as to his injuries by a physician testifying for the defendant, and his refusal was properly sustained. No such assault as that contended for by the defendant will be permitted in any Texas court on the personal liberty of a citizen of this commonwealth. It would have been an outrage on the plaintiff to compel him to be anesthetized in order to give a physician an opportunity to prove his theories in regard to the injuries inflicted on the person of the plaintiff. The authorities cited by the defendant do not sustain the action sought by it as shown by its bill of exception, but which was sought to be changed by its assignment of error wherein it was attempted to convey the impression that the court refused to allow an examination of the injured limb, after the plaintiff had made profert of it by exhibiting it to a jury. The question of an anesthetic, which shaped the action of the court, was studiously avoided by the defendant in assignment and proposition. None of the authorities cited sustain the demand of the defendant as to the anesthetic's being administered to a party to a suit during the progress of a trial. An examination was not refused, but the stupefaction and destruction of the mental faculties of the plaintiff, even for a limited time, was correctly denied to the defendant.

Society Proceedings

COMING MEETINGS

Hawaii, Medical Society of, Honolulu, Nov. 19-21. Dr. F. J. Pinkerton, 45-46 Young Building, Honolulu, Secretary.
Isthmian Canal Zone, Medical Association of, Ancon, Dec. 15. Dr. L. S. Chapman, Ancon, Secretary.
Porto Rico, Medical Association of, Ponce, Dec. 15-17. Dr. Augustin R. Laugier, San Juan, Secretary.
Radiological Society of North America, Detroit, Mich., Dec. 4-8. Dr. M. J. Sandborn, Appleton, Wis., Secretary.
Southern Medical Association, Chattanooga, Tennessee, Nov. 13-16. Mr. C. P. Loranz, Empire Building, Birmingham, Alabama, Secretary.
Southern Surgical Association, Memphis, Tenn., Dec. 12-14. Dr. H. A. Royster, Raleigh, N. C., Secretary.
Tri-State District Medical Society, Peoria, Ill., Oct. 30-Nov. 2. Dr. William B. Peck, Freeport, Ill., Managing Director.
Virginia, Medical Society of, Norfolk, Oct. 31-Nov. 3. Mr. G. H. Winfrey, 104½ W. Grace Street, Richmond, Secretary.
Western Surgical Association, Minneapolis, Minn., Dec. 8-9. Dr. Warren A. Dennis, Hamm Building, St. Paul, Secretary.

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS AND ABDOMINAL SURGEONS

Thirty-Fifth Annual Meeting, held at Albany, N. Y., Sept. 19-21, 1922

The President, DR. ROLAND E. SKEEL, Los Angeles, in the Chair

Tumors of the Breast

DR. JOHN F. ERDMANN, New York: In the single growth, the blue dome cyst of Bloodgood, the discrete fibroma and the canalicular growth, the operation of removal resolves itself into a resection of the area well outside of the tumor, with proper suture repair. A growth in the remaining breast is as likely to be of primary origin as that in the breast first removed. Further, at the present day we are unable to state what the influence of roentgen-ray and radium treatment is either as a preoperative or postoperative aid. But in view of many apparent reductions in size, etc., previous to operation in cases considered nonoperable, the use of the roentgen ray and radium should be encouraged. Even in view of some of the glowing reports at present regarding the nonrecurrence, postoperative treatment should be substituted for preoperative treatment, until some definite proof of its help or inefficiency has been established. In the presence of late metastases the powerful currents of the present day should be given a thorough test to prove or disprove the efficiency of this method of treatment. The most thorough and painstaking wide removal, with remote glandular and fascial dissections, will tend more and more to increase the percentage of cures and extension of life. The radical operation is attended with so low a mortality as to promote a greater desire on the part of the consulting physician to demand operation.

Double Uterus and Vaginal Septum

DR. H. WELLINGTON YATES, Detroit: I have observed one case of abortion at about the sixth week in a patient who had a complete vaginal septum and a double uterus, the latter also having a septum between two otherwise normal uterine cavities.

Craniotomy

DR. A. M. MENDENHALL, Indianapolis: We should have no hesitancy in deciding on craniotomy when the child is dead and there are no insuperable obstacles to pelvic delivery of the mutilated child. Craniotomy on a living child may be indicated if there exists little or no hope of its ultimate survival, and if the mother would be seriously jeopardized by any other method of delivery. The operation per se should carry with it no maternal mortality. With the safety of cesarean section in its various forms developed as it is today, a craniotomy performed on a living child always represents improper care either by the operator or by his predecessors on the case.

Radium in the Treatment of Uterine Hemorrhage of Nonmalignant Type

DR. EDWARD A. WEISS, Pittsburgh: In the treatment of benign hemorrhage from the uterus, radium should be used

only in selected cases, such as (*a*) myopathic bleeding of adolescence that do not respond to usual medical and hygienic measures; (*b*) myomas of small or moderate size, uncomplicated by adnexal disease, with bleeding as a symptom; (*c*) menorrhagia of menopause. The dosage depends on (*a*) the age of the patient and (*b*) whether the function of childbearing is to be preserved or sacrificed. Myomectomy in young women and hysterectomy when the tumor is large or complicated should be done rather than to treat with radium. Complications and unfavorable results are to be avoided only by a careful discriminating differential diagnosis. All cases treated by radium should be followed up for several years.

The Cervix as a Focal Point of Infection

DR. GORDON K. DICKINSON, Jersey City, N. J.: The cervix is a definite organ with a distinctive function. As a portal to the endometrium, it allows passage of nature's fluids. It also picks up and carries bacteria into the recesses of the mucosa, where they are either destroyed or become saprophytes. Harbored microbes may inflame the cervix, and through the lymph stream cause more or less regional reaction, or, by the blood stream, a varied expression.

Uterine Displacements and Sterility

DR. BENJAMIN RUSH MCCLELLAN, Xenia, Ohio: Uterine malpositions are the cause of sterility in a limited number of cases, probably not more than 10 per cent. Long continued sterility or repeated abortions should make the gynecologist suspect a displacement of the uterus. Malpositions act as a cause of sterility by (*a*) mechanically interfering with the progress of the spermatozoa into the uterine cavity, and (*b*) by contributing to the functional disability of the tubes and ovaries, which, when long continued, results in organic degeneration, especially in the ovaries. In a very few well selected cases a well placed pessary, plus wisely directed hygienic and therapeutic remedies, should be given a fair trial. Operative intervention is indicated when this treatment has failed, and when there is no legitimate contraindication.

The Present Status of Surgery in the Treatment of Fibromyomata Uteri

DR. STEPHEN E. TRACY, Philadelphia: Of all of the patients who consult a surgeon for symptom-producing fibroids, 30 per cent. have either degeneration of the tumor or malignancy of the pelvic organs. Abdominopelvic disease is found in 40 per cent. of the cases. Seventy per cent. of these patients have complicated tumors. In women past the age of 40, only from 16 to 18 per cent. have simple, uncomplicated tumors. It is impossible to determine which are the simple, uncomplicated tumors. The treatment of choice in the vast majority of cases is myomectomy for women under 40, and hysterectomy in women past this age. The form of treatment removes all disease and relieves the patient of all symptoms in from 96 to 98 per cent. of cases. The use of radium should be restricted to small or medium sized uncomplicated tumors at the menopausal period in cases of menorrhagia or metrorrhagia following myomectomy, and in certain constitutional diseases in which surgery would be attended with unusual risk.

Clinical Aspects of Blood Loss in Labor

DR. PAUL T. HARPER, Albany, N. Y.: When efforts at stimulation have failed to excite the uterus to activity, further administration of drugs or application of measures that depend on latent muscular efficiency to accomplish results may not be practiced. The means to be employed then is firm intra-uterine tamponade. Intra-uterine tamponade will check any postpartum hemorrhage; and such preparations should be made that it can be carried out without delay as soon as the more conventional methods demonstrate their inadequacy. While the management of lost blood mass and shock is important, it is with prevention of these states that the obstetrician is primarily concerned. The time to infuse or to transfuse is before shock is fully developed, and shock may be expected when a difficult operative delivery, particularly one in which extensive trauma to the maternal soft parts has been done, is followed by hemorrhage even of moderate degree. Nothing may avail when shock is preliminary to collapse, while satisfactory results are not impossible in ordinarily grave cases when vigorous general treatment is instituted early enough.

Pituitary Extract in the Second Stage of Labor

DR. MAGNUS A. TATE, Cincinnati: I have used pituitary extract in the second stage of labor for a number of years, and I have come to the conclusion that if used judiciously, from an obstetric standpoint, it is a boon to motherhood.

Transplantation of the Cervix

DR. W. WAYNE BABCOCK, Philadelphia: This operation consists of a submucous transplantation of the cervix to a more posterior position in the vaginal culdesac. About 2 cm. distant from the os uteri a circular incision is made through the mucous membrane. Through this incision the cervix is mobilized, and the submucous tissues are bluntly tunneled to the desired point in the culdesac, where a transverse incision from 2 to 4 cm. in length is made. Guide sutures are fixed to the mucous edges of the cervix, carried through the tunnel, and by traction on the sutures the cervix is pulled in place, when the cut mucous edges of the cervix are accurately approximated to the edges of the vaginal incision. The object of the operation is to increase the length of the anterior wall of the vagina; to displace the lower part of the uterus upward and backward; to change the direction of the cervix so that it will point in a more posterior direction, and to place the cervix more directly in the seminal lake. The operation is used in certain cases of sterility, anteflexion of the cervix, anteposition of the lower uterus segment, and for undue shortness of the anterior vaginal wall. In some cases the sutures are made to embrace the uterosacral ligaments so as better to hold the cervix up and back.

A Routine Treatment for Hyperemesis Gravidarum

DR. EDWARD SPEIDEL, Louisville, Ky.: The routine treatment consists of the daily administration by rectum of a solution containing glucose, a predigested medicinal food, sodium bicarbonate and water. Sodium bromid and chloral are added according to indications. Every third day, 500 c.c. of 10 per cent. sterile glucose solution is given intravenously. Gastric lavage is practiced on the eighth day, and then oral administration of food is begun on the ninth day. If the patient vomits in spite of this rigid regimen, then interruption of pregnancy will be necessary.

Renal Tuberculosis: Diagnosis and Treatment

DR. HENRY DAWSON FURNISS, New York: Renal tuberculosis is a chronic disease and slow in development. In my cases, symptoms referable to the condition existed before diagnosis three months in one case and thirteen years in another, with an average of approximately four years. In 20 per cent. there was a history of other previous tuberculous lesions that often antedated by a number of years the symptoms of the renal trouble. Three of these patients had bone tuberculosis that had healed five years before the onset of urinary symptoms. It is possible that the kidney lesions occurred during the acute stage of the bone trouble, and remained quiescent all this time. In 15 per cent. there were healed or active pulmonary lesions, and in two cases the pulmonary condition overshadowed the renal disease. In three cases there had been an old cervical adenitis. In none was genital or peritoneal tuberculosis discovered prior to operation, but one patient succumbed two years later to pulmonary and peritoneal tuberculous disease. Vesical symptoms usually give rise to the first complaint, and in young virgins frequency of urination should excite a suspicion of tuberculosis. Except in cases of miliary tuberculosis, renal tuberculosis is usually unilateral, at least at first. A small percentage of the patients develop perinephritic abscesses. The accepted treatment for unilateral renal tuberculosis is nephrectomy, provided there is no contraindication in other concurrent disease or renal insufficiency. The earlier the disease is eradicated, the better the chances of preventing further spread and of relieving the bladder condition. I have made it a practice not to remove kidneys discharging only tubercle bacilli. With bilateral involvement, some authorities have advocated removal of the kidney with the

more advanced lesion. This does not seem warranted unless the better kidney has only slight lesions with good function, and its ureter, with the part of the bladder surrounding it, are uninvolved. Even then, unless the patient was suffering acute renal pain, or there was vesical intolerance, I should withhold operation. When there is perinephritic abscess, the kidney should be removed, if removal is not unduly risky.

The Pernicious Effects of the Use of Stems in the Uterus

DR. JAMES N. WEST, New York: In performing dilation and curettage, one should always wipe out the cervix with tincture of iodin so as not to carry the organisms which are found in the cervical canal into the body of the uterus, and inoculate the patient with them by means of the curet. This applies to any other intra-uterine instrumentation, except the use of forceps in delivery. I would advise against leaving uterine packing in place more than thirty-six hours, and then using iodoform gauze from which the iodoform has been washed by wringing out in water three or four times.

Transplantation of Human Ovaries: Present Status and Future Possibilities

DR. WILLIAM SEAMAN BAINBRIDGE, New York: The transplantation of ovarian tissue, either autogenous or homogenous, has proved successful for both therapeutic and fertilization purposes in human beings. For purely therapeutic uses an implantation may be effective at any one of several sites, but behind the rectus muscle where the graft will be removed from points likely to suffer traumatism, but in close proximity to the vascular and lymphatic systems, seems the most satisfactory site. For the purposes of fertilization, when the ovaries have been removed and the uterus is intact, in a woman of child-bearing age, a normal piece of ovarian tissue grafted in continuity with the fallopian tubes or at the stump of a tube, if the tubes have been excised, may live and form follicles and ova, and a pregnancy may be produced from the transplanted ovary. In the transplantation of ovarian tissue, the closer the relationship of the donor and recipient, the better, though such relationship is not necessary for purely therapeutic purposes.

An Operation for Retrodisplacements of the Uterus

DR. JOHN W. KEEFE, Providence, R. I.: A transverse incision is made through the peritoneum, one-half inch above the upper attachment of the bladder to the anterior wall of the uterus. The peritoneum and bladder are separated from the uterus as far as the junction of the cervix with the vagina, in a manner similar to that employed in separating the bladder from the uterus during operations for hysterectomy. The bladder is then pulled upward and attached by four interrupted chromic gut sutures passed through the bladder musculature and the anterior wall of the uterus at points just below a line drawn between the uterine attachments of the round ligaments. The flap of peritoneum which was reflected just before separating the bladder from the uterus is fixed by four interrupted catgut sutures to the fundus of the uterus, or to the posterior part of the fundus. The abdominal wound is closed with a continuous suture of catgut in the peritoneum, a double chromic catgut suture in the fascia, plain catgut in the fat, and interrupted dermol sutures in the skin. The operation of freeing the bladder from the uterus and raising it, so that it pulls upward the anterior wall of the vagina, aids in the cure of retroflexion, vesicoceles and slight prolapse of the uterus. Attaching the bladder to a higher position on the uterus has the effect of holding the uterus in a normal anteverted position, and of raising the anterior vaginal wall. Shortening the round ligaments by the method here advocated has the advantage of retaining the original attachments of the round ligament, so that traction on the fundus of the uterus is normally applied.

The Importance of Ureteral Palpation in the Diagnosis of Abdominal Disease

DR. DAVID W. TOVEY, New York: Normal ureters are easily palpated, and it is more easy to palpate diseased ureters. Palpation of the pelvic ureters will often clear up a difficult case, the diagnosis of which seemed impossible before palpation. The nerve plexuses of the ureter anastomose with all the other nerve plexuses of the abdominal sympathetic, so that pain from ureteral disturbance is diffuse, and may be mistaken for every abdominal and pelvic disease, even ectopic pregnancy.

Abdominal Adhesions

DR. MILES F. PORTER, Fort Wayne, Ind.: Adhesions which are not obstructive either to the circulation or to the lumen of hollow viscera and are not accompanied by infection are harmless. Such adhesions encountered in the course of abdominal operations would better not be disturbed. Interposition of foreign substances between the viscera, either solid, liquid, semisolid or gaseous, will not prevent adhesions. The maximum conservation of tissues and general resisting powers are the best means known today of avoiding harmful adhesions.

Primary Sterility

DR. A. J. RONGY, New York: Transuterine insufflation of the peritoneal cavity with oxygen or carbon dioxid gas, as developed by Rubin, is a very valuable aid in the diagnosis of sterility. No other method of examination so clearly demonstrates the patency of the fallopian tubes. This method of examination should be utilized in every case in which the cause of sterility is of doubtful origin. It is especially useful in patients who have had one fallopian tube removed because of infection or extra-uterine pregnancy. The passage of gas under pressure through the tubes may prevent the formation of adhesions around the distal openings, and therefore closure of the tubes is less likely to occur.

The Defenseless Areas of the Abdomen

DR. GEORGE W. CRILE, Cleveland: In a general way it may be said that the defense of the tissues of the abdomen varies from almost 100 per cent. in the mucosa of the intestine—where the defense is so perfect that although it is constantly contaminated, the contamination rarely progresses to infection—to almost 0 per cent. in the retroperitoneal area, where contamination slowly, but insidiously and progressively, goes on to infection. In between the two lies the peritoneum, contamination of which rapidly progresses to infection, but as rapidly calls into action the mechanism of defense. The adequate defense of any tissue against infection demands an adequate nerve supply and an abundant supply of blood. The observance of certain fundamental principles diminishes the hazard not only of surgical procedures actually within the comparatively defenseless areas, but also of the extension of contamination or infection from adjacent areas. These fundamental principles are: avoidance of contamination, avoidance of anemia and promotion of blood supply and the two-stage operation.

Surgical Strategy as an Adjunct to Local Anesthesia in Abdominal Surgery

DR. ROBERT EMMET FARR, Minneapolis: Exposure and the absence of expulsive effort are the prime essentials in meeting the surgical demands in this class of cases. The abolition of the abdominal reflexes, vertical retraction and tilting of the table, combined with a negative intra-abdominal pressure, and the cooperation of the patient, which is best obtained by solicitous care of this individual from the time he presents himself for treatment, combined with the utilization of the skill and tact of a well trained psycho-anesthetist, will make it possible to perform with satisfaction a large percentage of abdominal surgery under local anesthesia.

The Surgical Treatments of Certain Puerperal Infections

DR. J. F. BALDWIN, Columbus, Ohio: In those rather rare cases in which the disease is virtually limited to the ovarian veins, ligation of the veins above the thrombus is feasible, but the death rate is not less than 60 per cent. Radical operation with free drainage of all the infected veins, and usually with hysterectomy, according to the results obtained in sixty-three consecutive cases, gives a death rate of a little less than 32 per cent., or about one half that of ligation, and that, too, in a more serious class of cases. Puerperal infection, in brief, is simply wound infection, and should be treated on general surgical principles.

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

American Journal of Ophthalmology, Chicago

September, 1922, **5**, No. 9

Delimiting Keratotomy. S. R. Gifford, Omaha.—p. 697.
Hypersensitiveness to Lens Protein. Patient Desensitized and Successfully Operated on for Immature Cataract. F. H. Verhoeff and A. N. Lemoine, Boston.—p. 700.
Neuropathic Keratitis; Result of Focal Infection. J. W. Charles, St. Louis.—p. 703.
Persistence of Embryonic Fibrovascular Sheath of Crystalline Lens. E. J. Lent and M. B. Lyon, South Bend, Ind.—p. 706.
Refraction. P. Sumner, San Francisco.—p. 712.
Refraction. S. A. Agatston, New York.—p. 716.
Trial Frames for Base Line Refraction. S. L. Olsho, Philadelphia.—p. 718.
Hysteric Homonymous Hemianopsia. J. L. Garvey, Ann Arbor, Mich.—p. 721.
Divergence Paralysis. L. W. Deichler, Philadelphia.—p. 723.
Fibrous Thickening of Upper Lid Following Diphtheritic Conjunctivitis. F. A. Morrison, Indianapolis.—p. 724.
Combined Perimeter and Scotometer, Simple and Efficient. E. J. Brown, Minneapolis.—p. 724.

American Journal of Physiology, Baltimore

September, 1922, **62**, No. 1

*Circulation in Mammalian Bone Marrow: Factors Concerned in Movement of Red Blood Cells from Bone Marrow into Circulating Blood as Disclosed by Perfusion of Tibia of Dog and by Injection of Bone Marrow in Rabbit and Cat. C. K. Drinker, K. R. Drinker and C. C. Lund, Boston.—p. 1.
*Morphin Hyperglycemia and Suprarenals. G. N. Stewart and J. M. Rogoff, Cleveland.—p. 93.
Effect of Ether Anesthesia on Afferent Paths in Decerebrate Animal. A. Forbes and R. H. Miller, Boston.—p. 113.
Comparison of Pentabromacetone Method, and Salant and Wise's Method for Citric Acid Determination in Urine. W. B. McClure and L. W. Sauer, Chicago.—p. 140.
Distribution of Vitamin B in Wheat Kernel. M. Bell and L. B. Mendel, New Haven, Conn.—p. 145.
*Effect of Pancreatic Extract (Insulin) on Normal Rabbits. F. G. Banting, C. H. Best, J. B. Collip, J. J. R. Macleod and E. C. Noble, Toronto.—p. 162.
Effect of Insulin (Pancreatic Extract) on Sugar Consumption of Isolated Surviving Rabbit Heart. J. Hepburn and J. K. Latchford, Toronto.—p. 177.

Circulation in Bone Marrow.—By the use of methods of perfusion and of injection, so organized as to approach the physiologic limits set by the animal under experiment, it has been shown by the Drinkers and Lund that the capillaries conducting blood in the bone marrow of the mammal in a condition of normal blood formation are closed structures, lined throughout with endothelium, and not in communication with the marrow parenchyma. Under conditions of active red blood cell formation, the extremely delicate walls of these capillaries are grown through by irregularly placed red cells in varying stages of maturity. The capillaries are thus, for a period of varying length, open structures, but the opening presented does not result in flooding the marrow parenchyma with blood because of the packing of the immature blood cells, which is an essential phase in the process of encroachment on the capillary wall. The normal mature erythrocytes are delivered to the blood stream through the extraordinarily thin endothelial membrane lining the capillaries. This process must occur constantly and under the influence of such slight difference in pressure between the outside and inside of the blood vessels as to cause no actual vascular rupture. The stimulus causing growth of red blood forming tissue is responsible also for delivery of these cells to the circulation.

Morphin Hyperglycemia and Suprarenals.—Stewart and Rogoff noted that hyperglycemia is much less commonly induced by morphin in cats which have recovered after removal of one suprarenal and denervation of the other, or after removal of one suprarenal and a large portion of the other, with or without denervation of the remnant or destruction of the medulla of the remnant, than in normal cats or in cats which have recovered from such operations as splenectomy. Some writers are inclined to attribute to the suprarenals, sometimes in conjunction with the thyroid, an important rôle in the regulation of body temperature, but no influence of the suprarenal operations on the rectal temperature of the animals was detected by Stewart and Rogoff.

Effect of Pancreatic Extract on Normal Rabbits.—Purified alcoholic extracts of pancreas, for which Banting et al. suggest the name insulin, when injected subcutaneously into normal rabbits cause the percentage of sugar in the blood to fall within a few hours. As a tentative basis for the physiologic assay of pancreatic extract, the authors consider as one unit the number of cubic centimeters which causes the blood sugar of normal rabbits to fall to 0.045 per cent. within four hours. This dose is decidedly active in lowering the blood sugar in diabetic patients. As the blood sugar falls, as a result of pancreatic extract injections, the rabbit exhibits highly characteristic symptoms, the earliest of which are signs of hunger and thirst, hyperexcitability and apparent fear. The animal may recover from these earlier symptoms but frequently, with active preparations, the hyperexcitability becomes extreme and clonic convulsive seizures involving the entire body and lasting for several minutes supervene. Between the convulsive seizures the animal is lying on its side in a more or less comatose condition with shallow rapid and frequently periodic breathing. In the great majority of cases exhibiting convulsion the blood sugar has been found to be about 0.045 per cent.

Annals of Medical History, New York

1922, **4**, No. 2

De Staticis Experimentis of Nicolaus Cusanus. H. Viets, Boston.—p. 115.
Guy Patin and the Medical Profession in Paris in the Seventeenth Century. F. R. Packard Philadelphia.—p. 136.
Louis Daniel Beauperthuy. C. A. Wood, Chicago.—p. 166.
William and John Hunter. T. McCrae, Philadelphia.—p. 175.
Sir Richard Blackmore, M.D. T. N. Toomey, St. Louis.—p. 180.
Treatment of Convulsions (Tetany) with Calcium in the Seventeenth Century. P. G. Shipley.—p. 189.
What Was Kappa Lambda? C. D. Leake, Madison, Wis.

Annals of Surgery, Philadelphia

September, 1922, **76**, 3

Opportunities and Responsibilities of Surgeon. J. M. T. Finney, Baltimore.—p. 293.
End Results in Cancer as Influenced by Type, Reaction, Location and Age. C. H. Mayo, Rochester, Minn.—p. 308.
*Secondary Manifestations of Malignant Disease. A. Primrose, Toronto.—p. 312.
*Recurrence Versus Metastasis in Carcinoma. E. Eliot, Jr., New York.—p. 324.
Treatment of Cancer of Jaws. A. J. Ochsner, Chicago.—p. 328.
Carcinoma of Thoracic Esophagus. H. Lilienthal, New York.—p. 333.
End Results of Treatment in Certain Forms of Malignancy of Neck. M. B. Tinker, Ithaca, N. Y.—p. 335.
*End Results of Operations for Cancer of Breast. F. E. Bunts, Cleveland.—p. 341.
*Id. H. Gage and D. S. Adams, Worcester, Mass.—p. 346.
*End Results of Operations for Cancer of Bladder. W. E. Lower, Cleveland.—p. 352.
*Results of Treatment by Radiation of Primary Inoperable Carcinoma of Breast. B. J. Lee, New York.—p. 359.
End Results of Operations for Carcinoma of Rectum. D. F. Jones and L. S. McKittrick, Boston.—p. 386.
End Results of Surgical Treatment of Carcinoma of Cervix Uteri. L. Davis, Boston.—p. 395.
*Factors Influencing Life Expectancy of Patients Operated on for Gastric Ulcer. D. C. Balfour, Rochester, Minn.—p. 405.
*Resection of Body of Stomach for Ulcer. E. S. Judd and J. H. Lyons, Rochester, Minn.—p. 409.

Secondary Manifestations of Malignant Disease.—Primrose discusses metastasis through lymph channels; abscess formation and gland metastasis; implantation carcinoma; dissemination through the blood stream and bone metastasis citing cases of each. One of the vagaries of secondary tumors, he says, is found in patients in whom a single lymph gland becomes the seat of a metastatic growth without any tendency for the involvement of other nodes in the neighborhood. The absence of secondary metastases in so-called primary carcinoma of the appendix he regards as significant. One case cited suggests the implantation of cancer by the autoinoculation of ascitic fluid in a woman who suffered from general abdominal carcinomatosis. He warns against implantation and dissemination of cancer during operative procedure.

Recurrence Versus Metastasis in Carcinoma.—Clinical evidence pointing to the possibility of the independent development of multiple carcinomatous foci is presented by Eliot as against metastasis. In one case there was development of

two carcinomatous foci of about the same size in a breast and presenting identical physical signs, yet separated by a considerable interval of normal glandular tissue. Other cases illustrating the development at or about the same time of carcinoma in widely separated parts of the body are also cited.

End-Results of Operation for Breast Cancer.—From Bunts' survey it is evident that the early removal of any growth in the breast remains the one and only sure method of treatment.

Id.—Gage and Adams assert that any lump in the breast is to be regarded with suspicion and carefully watched. Its persistence, and especially its activity, as indicated by increase in size, is ground for its removal, though not necessarily involving removal of the entire breast. A continued discharge from the nipple means a pathologic condition in the breast which must be kept under close observation.

End-Results of Operations for Bladder Cancer.—The percentage of recurrence in cancer of the bladder, Lower states, is great whatever the method of operation, whether excision or cauterization. Recurrence is no contraindication for treatment, as some of the best results have resulted from operation on cases with recurrences. Repeated observation after operation is absolutely essential if the mortality of carcinoma of the bladder is to be reduced. The good results of the treatment of recurrences are due to the fact that recurrences are nearly always local and very seldom metastasize.

Results of Radiotherapy in Primary Inoperable Breast Cancer.—Eighty-one cases are analyzed by Lee. It seems that primary inoperable carcinoma of the breast has shown good results by radiation. The patient must be kept under constant clinical observation. The type of radiation must be properly selected for each individual case. No routine prescription will suffice. Overtreatment by radiation must be avoided. Very advanced cases are unsuitable for any form of treatment. The palliative operation following properly planned radiation is of service in well selected cases. A cooperating social service department makes a follow-up system effective. Lee's results to date are very gratifying and encouraging to him.

Factors Influencing Life Expectancy After Gastric Ulcer Operations.—Among 1,280 patients with gastric ulcer operated on in the Mayo Clinic during a period of fifteen years, 195 deaths occurred following satisfactory recovery from the operation. There were seventy-five deaths from gastric cancer, comprising about 40 per cent. of the total number of deaths, and the remainder in which the cause is known are said, with few exceptions, to be due to causes independent of the stomach.

Resection of Body of Stomach for Ulcer.—Judd and Lyons state that sleeve resection is well suited for some ulcers high on the body of the stomach, for large perforated ulcers, and for multiple ulcers. It is the ideal procedure in hour-glass stomachs. The authors assert that the danger of hour-glass constriction following sleeve resection has been exaggerated. The functional results of this operation are very satisfactory.

Archives of Dermatology and Syphilology, Chicago

October, 1922, **6**, No. 4

*Tissue Reaction in Malignant Epitheliomas of Skin: Its Value in Diagnosis and in Prognosis. H. J. Parkhurst, Toledo, Ohio.—p. 401.
Expectancy in Roentgen-Ray Treatment of Skin Lesions from Pathologic Standpoint. W. J. Highman and R. H. Rulison, New York.—p. 413.
*Carcinoma of Tongue and Treatment with Radium. L. Taussig, San Francisco.—p. 424.
*Cancer of Lip Treated by Electrocoagulation and Radiation. G. E. Pfahler, Philadelphia.—p. 428.
*Treatment of Cancer of Lip by Radiation. E. S. Lain, Oklahoma City.—p. 434.
Cutis Verticis Gyrata: Report of Case. H. E. Alderson, San Francisco.—p. 448.
Physical Principles Underlying Development of High Voltage Roentgen-Ray Apparatus. C. N. Moore, Schenectady, N. Y.—p. 455.
Lupus Erythematosus Acutus Disseminatus Hemorrhagicus: Report of Case. M. Scholtz, Los Angeles.—p. 466.
New Findings in Pemphigus Vulgaris. K. Gawalowski, Prague, Czechoslovakia.—p. 476.

Tissue Reaction in Skin Epithelioma.—The slides from 100 epitheliomas were examined by Parkhurst. The number of plasma cells and, to a somewhat less extent, the number of lymphocytes, varied directly with the amount of hyaline degeneration of the connective tissue. The apparent strength of the cancer cells and the number of mitoses seems to bear no constant relationship to any other feature, nor to each other. Mitotic figures may be entirely lacking, and they are usually not so numerous as might be expected. Plasma cells are never found in the absence of hyaline degeneration. As the number of plasma cells is an indication of the degree of resistance (immunity) of the tissue (derma), the malignancy of the neoplasm varies inversely in proportion to the number of plasma cells. The more malignant the process, the less the number of plasma cells, showing that the neoplasm is developing so rapidly that the tissue has not the time to develop any resistance. This is considered to be a note of prognostic value.

Radium Therapy of Tongue Carcinoma.—Fourteen patients with carcinoma of the tongue were treated with radium by Taussig. Four had syphilis in addition to carcinoma. Four are clinically free of the disease, two at two years after treatment, one at one and a half years and one at six months. Five showed cervical metastases at the time treatment was instituted and five of the others developed an involvement of the glands during treatment. None of these patients survived. Ten are dead, or when last seen were in such condition that the end was only a matter of time. Several other patients received their first treatment but did not again report for observation or further treatment, and were not traced. Taussig believes that it is reasonable to expect that with improved technic it will be possible to cure 25 per cent. of unselected cases of carcinoma of the tongue by irradiation.

Electrocoagulation and Radiation of Lip Carcinoma.—Local destruction of the lesion by electrocoagulation, followed by thorough radiation, Pfahler asserts, should effect a cure in practically all cancer of the lip cases if patients are treated early. Thorough radiation by radium or the roentgen rays should be given over the lymphatics draining the diseased area. Recurrent carcinoma gives much less satisfactory results. Metastatic lymph nodes should be treated by surface radiation and then by radium implantation or by excision.

Radiotherapy of Lip Carcinoma.—The cellular morphology of a cancer of the lip, Lain says, has less importance in the prognosis than the location or degree of development, or the age of the patient. On account of a beginning atrophy of the lymph system, after a certain age the prognosis is better. Especially is this true in cancer of the lower lip. A prickle or a squamous cell cancer, in the early stage of its growth, will undergo degenerative changes under radiations from either radium or roentgen ray just as the basal cell variety does. They differ only in the amount of radiation necessary and the technic of its application. Statistics verified both by clinical and by laboratory findings justify the conclusion that cancer of the lip is equally and, perhaps, more amenable to treatment by roentgen ray or radium than by surgery, and in most cases radiotherapy is to be preferred.

Canadian Medical Association Journal, Montreal

September, 1922, **12**, No. 9

Relations of Heredity and Environment of "Constitution" and "Condition" to Predisposition to Disease. L. F. Barker, Baltimore.—p. 601.
Some Phases of Dysthyroidism. C. P. Howard, Iowa City.—p. 606.
Study of Symptoms. T. McCrae, Philadelphia.—p. 610.
*Regulatory Function of Kidney in Nephritis. E. M. Watson.—p. 616.
Two Cases of Polyneuritic Affection Resembling Acrodynia Met with in Young Children. L. M. Lindsay.—p. 618.
Renal Tuberculosis. D. W. MacKenzie.—p. 620.
*Reaction of Blood in Reference to Regulation of Respiration and Influence of Anesthesia Thereon. A. W. Downs.—p. 625.
End Results of Surgical Treatment of Diseases of Stomach and Duodenum. A. J. A. Hamilton, Boston.—p. 629.
*Chronic Arthritis: Etiology and Treatment. A. A. Fletcher.—p. 633.
*Bone Suppuration Basic Cause of Renal Calculus in Twenty Cases Following War Wounds. H. E. Paul.—p. 638.
Studies in Radium. H. Mackay.—p. 643.
*Embolism of Abdominal Aorta. C. F. Wylde.—p. 647.
Should Sanatorium Laboratory Do Complement Fixation and Other Serum Tests as Routine Measures. A. H. W. Caulfeild.—p. 650.
Mesenteric Thrombosis; Report of Two Cases. C. B. Parker.—p. 655.
Bilateral Carcinoma of Breast. Webster and Hooper.—p. 659.

Regulatory Function of Kidney in Nephritis.—Watson points out by means of curves that the regulatory function of the kidney is interfered with in nephritis as shown by the limited power of water excretion and the absence of the

normal morning alkaline tide. The nephritic kidney is apparently not unable to excrete an acid urine. The deficiency rests in the fact that it produces a urine with a high acidity factor at a time when a normal kidney produces a urine with a low acidity factor. The water test of Leathes, may be used as a means for detecting impairment of renal function.

Reaction of Blood; Regulation of Respiration.—The point is brought out by Downs that the use of carbon dioxid by inhalation during anesthesia is illogical. Carbon dioxid is probably the most effective stimulus to the respiratory center and during anesthesia, as a result of the action of the anesthetic, the sensitivity of the center is decreased so that it will tolerate a higher tension of carbon dioxid, and thus it might appear sound to administer carbon dioxid for the purpose of stimulating the center, but experiments show that the response of the regulating mechanism is sufficient to maintain the reaction of the blood within physiologic limits. Therefore, the administration of carbon dioxid does not appear necessary and it would seem unwise to run the risk of overbalancing this mechanism with the possibility of causing a fatal acidosis. On the other hand the administration of sodium bicarbonate to maintain the power of the organism to combine with acids produced during anesthesia appears a rational procedure. Its use, however, is to be restricted to those cases in which there is positive indication for its employment, when the carbon dioxid capacity of the plasma is less than 58 c.c. per hundred c.c. In the normal subject under ordinary conditions the organism is capable of caring for the excess of acid bodies produced during anesthesia and intervention is not called for.

Diet in Chronic Arthritis.—Fletcher has made a systematic survey of about 150 unselected cases of arthritis deformans, in which, under careful control, the effect of dietetic treatment has been observed and in which the sugar tolerance has been estimated. A more or less general routine was carried out for all these patients. After rest in bed for at least two weeks, and after the disease had reached a stationary stage, the patient was given daily six glasses of milk and three of buttermilk, one or two oranges, half a grape fruit for one week. This amount was then gradually increased by the addition of vegetables and fruits containing less than 15 per cent. carbohydrates, egg, fish, fowl, meat, soups, junkets and jellies, and finally brown bread in small amounts, giving a daily intake of from 1,500 to 2,000 calories in four weeks' time. Those under weight were allowed in addition cod liver oil and cream. During this period of four weeks, no other form of treatment was given except that bowel movements were secured by enemas when necessary on alternate days, and in a few cases liquid paraffin was given by mouth. The results leave no doubt that careful dietetic regulation must be given an important place in the therapy of this disease. Women, as a group, are much more favorably influenced by dietetic treatment than are men.

Bone Suppuration Causes Renal Calculus.—Observation has convinced Paul that there is undoubtedly a very definite etiologic relationship between the bone suppuration and the formation of renal calculi in the twenty cases analyzed. Approximately 90 per cent. of these cases show definite signs of infection in the urine from the affected kidney, which fact is fairly good presumptive evidence that infection is a definite contributing cause, if not the most important cause, of renal calculi. Lack of drainage in the upper urinary tract is seemingly not an important primary cause of the formation of renal calculi following such a systemic infection as osteomyelitis. Sedentary habits of life likewise have no direct relationship to calculus formation, where such formation follows a systemic infection as osteomyelitis. Paul is convinced that if every case of nephrolithiasis could be investigated with sufficient thoroughness, a history of a preceding systemic infection could be elicited. The removal of calculus from the upper urinary tract should be considered only an important preliminary step in the cure, and treatment of the concurrent infection must be carried out thoroughly if recurrence is to be avoided.

Embolism of Abdominal Aorta.—Wylde reports two cases. In one case a portion of a mural thrombus in the left auricle had evidently become detached and passing through the mitral and aortic orifices into the aorta had been arrested at its bifurcation. A part of the embolus extended into each common iliac and caused complete obstruction in the right leg and partial obstruction in the left. A portion of the embolus in the right common iliac had broken off, passed down into the right femoral, obstructing it, and leading to gangrene of the leg which necessitated amputation. The second case was practically identical with the first. The source of the embolism was a large globular ball thrombus which lay in the left auricle occluding a stenosed valve. This ball thrombus had evidently broken free sometime previously from a thrombus mass in the left auricular appendix, fragments of which still remained attached in situ.

Boston Medical and Surgical Journal

Sept. 14, 1922, **187**, No. 11

*Malignancy in War Veterans. W. F. Cotting, Boston.—p. 381.
*Tuberculosis of Breast; Report of Two Cases. P. H. Leavitt, Brockton.—p. 392.
Etiology of Sterility in Female, From Analysis of 500 Case Records. D. Macomber, Boston.—p. 397.
Fracture of Lower End of Radius Associated with Fracture or Dislocation of Lower End of Ulna. J. Homans and J. A. Smith, Boston.—p. 401.
Heritage and Reckoning of Surgeon. M. F. Fallon, Worcester.—p. 407.
Treatment of Tonsils by Radiations from Radium Salts Instead of Operation. F. H. Williams, Boston.—p. 412.

Malignancy in War Veterans.—The cases by Cotting are noteworthy chiefly because of the youth of the subjects, most of them at an age when one hardly expects carcinomatous disease. Seven were between 20 and 30, four between 30 and 40, and three between 40 and 50. The types of tumor were as follows: Carcinoma of rectum, metastatic carcinoma of liver, cholelithiasis; carcinoma in nostrils; cancer of head of pancreas; cancer of gallbladder; carcinoma of the pancreas, with metastases in the liver, spleen, retrosternal lymph glands, and probably in the lung; carcinoma of stomach; cancer of lung with extension into the spinal cord; malignant lymphoma and glioma of the optic thalamus.

Tuberculosis of Breast.—Leavitt's patients were women, aged 39 and 24, respectively. In both cases the affected breast was removed.

Johns Hopkins Hospital Bulletin, Baltimore

September, 1922, **33**, No. 379

*Factors Which Determine Concentration of Calcium and Inorganic Phosphorus in Blood Serum of Rats. B. Kramer and J. Howland, Baltimore.—p. 313.
*Study of Results Obtained in Sixty-Four Cesarean Sections Terminated by Supravaginal Hysterectomy. J. W. Harris, Baltimore.—p. 318.
*Air Embolism Following Various Diagnostic or Therapeutic Procedures in Diseases of Pleura and Lung. K. Schlaepfer, Baltimore.—p. 321.
*Effect of Saline Purgatives on Absorption of Other Drugs. D. I. Macht and E. M. Finesilver, Baltimore.—p. 330.
Localization of Cutaneous Nerves by Electrical Stimulation, Applied to Nerve-Block Anesthesia. W. Hughson, Baltimore.—p. 339.
Effect of Sodium Germanate on Total Hemoglobin of Albino Rat. J. E. Nowrey, Jr., Baltimore.—p. 340.
*Giant Centrospheres in Xanthomatous Tumors. D. T. Smith, Baltimore.—p. 342.
Normal Pregnancy Following Insertion of Outer Half of Fallopian Tube Into Uterine Cornu. T. S. Cullen.—p. 344.
Operation for Total Extirpation of Tumors in Cerebellopontine Angle. W. E. Dandy.—p. 344.

Factors Determining Concentration of Calcium and Inorganic Phosphorus in Serum.—A study has been made by Kramer and Howland of the influence of various factors on the concentration of calcium and inorganic phosphorus in the serum of rats. The concentration of neither element has been distinctly increased beyond normal limits, either as the result of various additions to the diet or the use of physical agents. It is possible to reduce the concentration of these elements in the serum by feeding diets containing an insufficient quantity of the respective elements. In order to bring this about there must be only enough of the organic factor represented by cod-liver oil or butter fat to prevent xerophthalmia and allow moderate growth. Even with a very small amount of calcium or phosphorus in the diet, compensation occurs and the concentration of these elements in the serum approaches the normal level if sufficient of the organic factor is included in the diet. A defect in the diet is accentuated in succeeding generations, so that a diet which gives a normal value for the serum calcium in the second generation may give

a distinctly low figure in the third generation. Of the fats that have been employed in these experiments the fat from the livers of fish has been much more effective than butter fat. The vegetable oils (olive and maize) have been without influence. When the concentration of either element in the serum is low as a result of a deficiency in the diet, it may be increased by increasing the amount of the respective element in the food. When the diet is defective in phosphorus and the phosphorus of the serum is therefore low, a marked increase of the serum phosphorus may be produced by starvation, by the addition of phosphorus to the diet in organic or inorganic form, by various fats, and by exposure to radiations from various sources which yield, among others, rays whose wave lengths are less than 3,000 Aengstrom units.

Results of Supravaginal Hysterectomy Done at Time of Cesarean Section.—In 223 cesarean sections done in the obstetric service of the Johns Hopkins Hospital up to May 15, 1922, the uterus was removed by supravaginal hysterectomy in sixty-four instances. There were three deaths, a gross mortality of 4.68 per cent. None of the deaths were due to infection and only one of them was associated directly with the operation. In forty-one of these sixty-four cases the uterus was removed at the first cesarean section. In twenty-three cases of the sixty-four the prime or secondary object of the hysterectomy was sterilization. The late cesarean operation is regarded as an extraordinarily dangerous operation and, in such cases, Harris says if one is not prepared to sacrifice the uterus, pubiotomy must be done or the child destroyed if the patient is to be safeguarded, whereas by resorting to radical measures results may be obtained which are comparable to those following conservative cesarean section done at an elective time either before or just after the onset of labor.

Air Embolism Following Procedures on Chest.—Following various diagnostic and therapeutic procedures on the chest (puncture, irrigation of a cavity, changing tubes, introducing a probe or a rubber catheter, bismuth paste filling, decortication, thoracoscopy, fat or paraffin plombage, pneumotomy, pneumectomy), Schlaepfer says complications may ensue which have been proved experimentally and clinically to be caused by air emboli. The clinical pictures of these air emboli show a wide variety. They should be made more exact by further thorough study of these complications by means of ophthalmoscopic, stool and urine examinations. The best therapy, in Schlaepfer's opinion is the preventive one. When an air embolus occurs, the operation should be stopped immediately; the head of the patient put low; the heart action reinforced with stimulants. Epinephrin injections, administered intravenously, will increase the amount of blood passing through the brain by diminishing the blood supply in the splanchnic areas (intestines, skin).

Effect of Saline Purgatives on Drug Absorption.—The experiments described by Macht and Finesilver it is asserted establish beyond doubt that saline purgatives can and do affect markedly the absorption and consequent excretion of other drugs. It was found that all the drugs examined were markedly delayed in their absorption from the stomach and intestines when they were administered subsequently to or even simultaneously with saline laxatives. The absorption and subsequent secretion of phenolsulphonephthalein and sodium salicylate were markedly affected by saline purgatives, even when the former drugs were administered by intramuscular or intraperitoneal injection. Laxatives other than those of the "saline" type exerted no important effect on the absorption of the drugs from the stomach and intestines. These findings have an important practical bearing on the therapeutic administration of medicaments. The experiments, especially those with phenol and mercuric chlorid, furthermore, speak in favor of a more extensive employment of saline laxatives in the treatment of toxicologic cases.

Giant Centrospheres in Xanthomas.—Giant centrospheres were present in the pigment containing cells of nine out of seventeen xanthomatous tumors examined by Smith. They are probably to be regarded as evidence of degeneration.

Operation for Extirpation of Tumors in Cerebellopontile Angle.—Dandy makes a bilateral suboccipital exposure of the cerebellum with as much exposure of the affected angle as possible. The interior of the growth is removed with a curet. Following this, the capsule is picked up with forceps and beginning at the upper and lower poles, carefully drawn away from the medulla, pons and midbrain. The traction brings into view the several small veins and arteries crossing from the brainstem to the tumor. These vessels are ligated individually with silver clips or fine silk ligatures and divided. Gradually, in this painstaking way, the whole tumor is delivered from its bed without bleeding, and without trauma to the brainstem. The cranial nerves stretched by the tumor are automatically liberated as the capsule falls away from them.

Kentucky Medical Journal, Bowling Green

September, 1922, **20**, No. 9

Focal Infection, "Epilepsy," "Insanity," Asylum Reform. C. A. L. Reed, Cincinnati.—p. 585.
Salivary Fistula: Case Report. S. G. Dabney Louisville.—p. 589.
Immediate Repair of Lacerations Versus Delay. A. N. Pickett, Louisville.—p. 590.
Uterine Prolapse with Associated Pelvic Relaxation. C. G. Arnold, Louisville.—p. 593.
Pruritus Ani: Case Report. B. Asman, Louisville.—p. 599.
*Paralysis Agitans as Sequel of Encephalitis; Case Report. J. J. Moren, Louisville.—p. 600.
Deep Abscess and Cellulitis of Abdominal Wall Following Pneumonia: Inoperable Mammary Cancer: Case Reports. J. W. Price, Louisville.—p. 602.
Cancer of Prostate Gland, Treated by Radium; Case Report. W. Frank, Louisville.—p. 603.
*Abscess of Liver. J. P. Boulware, Louisville.—p. 605.
Interesting Case of Acute Mania. H. E. Tuley, Louisville.—p. 606.
Polycystic Kidney: Hypernephroma—Case Reports. I. Abell, Louisville.—p. 607.
*Tumor of Pituitary; Report of Case. L. K. Baldauf, Louisville.—p. 610.
Relation of Water to Production of Goiter. V. D. Guittard, Maysville.—p. 612.
Memorial on Life of Dr. St. Joseph Buford Graham. J. G. C. Stanford.—p. 615.
Classification, Terminology and Etiology of Tumors. S. Graves, Louisville.—p. 617.
Value of Periodical Physical Examination. W. N. Lipscomb, Lexington.—p. 626.
Case of Suppurative Ethmoiditis Complicated by Orbital Cellulitis and Acute Suppurative Dacryocystitis. W. Dean, Louisville.—p. 630.
Mortality and End Results in Surgery from Personal Experience. J. H. Caldwell, Newport.—p. 631.
Fracture of Skull Base with Superficial Hemorrhage on Opposite Side: Report of Interesting Autopsy. S. Graves, Louisville.—p. 634.
Bilateral Renal Calculi—Case Report. O. Grant, Louisville.—p. 636.
Removal of Morbid Fears and Similar Besetments—Principles in Some Illustrative Cases. T. A. Williams, Washington, D. C.—p. 638.
Mutual Interest of Profession and Public. W. S. Rankin, Raleigh, N. C.—p. 640.
Directions for Cleaning up Town. M. M. Carrick, Dallas.—p. 641.
Syphilis. S. J. Rose, Winchester, Ky.—p. 643.
Death from Cardiac Embolus—Case Report. L. K. Baldauf, Louisville.—p. 645.

Paralysis Agitans Sequel of Encephalitis.—In March, 1919, Moren's patient, aged 26, had influenza and married a short time afterward. She then had no illness of any consequence until November, 1920, when she suffered severe radiating pains about the head and neck and had some delirium. This persisted for nearly six weeks. During December she gave birth to a child apparently without complications. A short time after delivery the family noticed she did everything very slowly. There was some improvement in her condition, and she then became pregnant the second time. After this she appeared more like herself and seemed normal. In September, 1921, she gave birth to her second child without any complications. Following this delivery her slowness of movement and slowness of speech became markedly increased. She seemed to be in worse condition than following the previous delivery. The interesting feature of this case in Moren's opinion is the fact that while cases of this kind have been reported as having occurred during pregnancy, the manifestations in this case followed pregnancy. During the time the woman was pregnant she seemed entirely normal.

Abscess of Liver.—Boulware reports a case which he believes was one of an old tuberculosis of the lungs, a secondary tuberculosis of the oviducts and ovaries, a secondary pyemic infection of a tuberculous tubo-ovarian abscess and a secondary metastatic infection of the liver resulting in a pyemic abscess. Death resulted from peritonitis induced by a rupture of the infected gallbladder.

Tumor of Pituitary Causes Impaired Vision.—Impaired vision in the right eye and a gradually increasing drowsiness marked the onset of the illness of Baldauf's patient. These symptoms were followed by a peculiar discomfort in the bitemporal to occipital region, a sort of a dull headache. Gross eye tests showed a right temporal hemianopsia. Roentgen-ray examination of the skull laterally showed a sella turcica much enlarged, deepened with probably some erosion. A diagnosis of pituitary tumor was made and operation advised.

Maine Medical Association Journal, Portland

August, 1922, **13**, No. 1

Transcript of Proceedings at Seventieth Annual Meeting of Maine Medical Association.—p. 1.

Minnesota Medicine, St. Paul

September, 1922, **5**, No. 9

Mobilization of Joints with Bony Ankylosis. W. C. Campbell, Memphis, Tenn.—p. 503.
Reconstruction of Tibia by Utilization of Fibula. A. A. Law, Minneapolis.—p. 507.
*Primary Carcinoma of Appendix. M. Warwick, St. Paul.—p. 512.
*Progress in Cancer Research. G. Luden, Rochester, Minn.—p. 519.
Nonsurgical Drainage of Biliary Tract: Few Clinical Experiences. H. J. Lloyd, Mankato, Minn.—p. 523.
Otolaryngology and General Practitioner. G. E. Shambaugh, Chicago.—p. 526.
Blood Pressure Technic Clarified. C. H. Clark, Gallup, N. M.—p. 529.
Essential Findings in 280 Cases of Pulmonary Tuberculosis in Children. J. M. Conroy and A. T. Laird, Nopeming, Minn.—p. 534.
Study of Severe Secondary Anemias. A. E. Mark, St. Paul.—p. 536.
Diagnostic and Therapeutic Aspects of Biliary Drainage. H. R. Hartman, Rochester, Minn.—p. 545.

Primary Carcinoma of Appendix.—Warwick reviews the literature on this subject which shows that in the routine sectioning of all appendixes removed at operation, carcinomas are found in from 0.2 to 0.8 per cent. Two definite types occur: the spheroidal or benign, and the adenocarcinoma or malignant type. While these two types present a different histologic picture, there are gradations from one to the other, making the differentiation between the two types often impossible. Chronic inflammation, while usually coexistent with the tumor, plays an unimportant rôle as an etiologic factor. It is evident that every appendix should be sectioned and when a carcinoma is present the patient's later health should be carefully watched from the viewpoint of the possible appearance of metastases.

Progress in Cancer Research.—Luden asserts that the history of cancer research shows that the formerly much derided biochemical conception of malignant growth has not only survived through twenty-four centuries, but that it is gaining ground today because instruments and methods for chemical investigations are available. The practical value of researches along chemical lines in malignancy has been demonstrated by recent investigations. The complexity of metabolic functions and the number of organs concerned in their regulation make it seem improbable that any single cause of or cure for malignancy is likely to be discovered. The very multiplicity of the factors underlying malignant growth warrants, however, that the consideration of all factors which tend to disturb metabolic processes in the body, that is, chemical processes, will prove of benefit to the victim of malignant disease. The complete and spontaneous regression of inoperable, malignant tumors in 100 well authenticated cases is conclusive evidence that the human body can wage a winning fight against malignancy. The knowledge that other patients have became clinically well, although the odds seemed entirely against them, can do no harm to any patient suffering from a malignant condition and may prove beneficial to him. Early diagnosis and early treatment of malignancy are of primary importance, but the regulation of the diet is of value, also, because it facilitates the chemical tasks of the body.

Nebraska State Medical Journal, Norfolk

August, 1922, **7**, No 8

Consultants I Have Known. M. Nielsen, Blair.—p. 257.
Lateral Sinus Complications of Purulent Otitis Media. A. H. Andrews, Chicago.—p. 263.
Diagnosis of Duodenal Ulcer. H. J. Lehnhoff, Lincoln.—p. 268.
Management of Acute Retention of Urine with Special Reference to Enlarged Prostate. J. E. Summers, Omaha.—p. 271.
Overmedication in Infancy and Childhood. W. O. Colburn, Lincoln.—p. 273.
Relation of Medicine to Law. C. C. Flansburg, Lincoln.—p. 276.
Local Anesthesia in General Surgery. A. L. McKinnon, Lincoln.—p. 280.
Report of Five Cases of Sporotrichosis. E. A. Watson, Grand Island.—p. 282.
Purpura Fulminans Complicating Scarlet Fever. N. T. Johnston, Upland.—p. 284.
Value of Saligenin, New Nontoxic Local Anesthetic, in Cystoscopic Examinations. A. L. Smith, Lincoln.—p. 286.

New Jersey Medical Society Journal, Orange

August, 1922, **19**, No. 8

Diagnostic Surveys by Diagnostic Commissions for Asylum Populations. C. A. L. Reed, Cincinnati.—p. 207.
Community Health Service. J. Nevin, Jersey City.—p 210.
Why Not Encourage Maternal Feeding? E. W. Murray, Newark.—p. 213.
Case of Mongolian Idiocy. F. H. von Hofe, South Orange.—p. 215.
Laryngeal Stenosis. Case Report. F. M. Hoffman and J F. McGovern, New Brunswick.—p. 216.
Case of Uterine Bleeding Treated with Radium. J. J. Mundell, Washington, D. C.—p. 218.

Northwest Medicine, Seattle

August, 1922, **21**, No. 8

Myomectomy for Myomas of Uterus. W. J. Mayo, Rochester, Minn.—p. 235.
Myxomatous Degeneration of Myofibroma of Uterus. P. Rockey, Portland, Ore.—p. 239.
Roentgen Ray Versus Surgery in Treatment of Fibroid Tumors of Uterus. J. L. Lane, Seattle.—p. 241.
Intrameningeal Hemorrhage of New-Born. E. J. Barnett, Spokane, Wash.—p. 243.
Infectious Diarrhea in Children. E. D. Carder, Vancouver, B. C.—p. 247.
Diseases of Hip Joint of Children. J. E. Tyree, Salt Lake City.—p. 250.
Primary Carcinoma of Liver. T. Torland, Seattle.—p. 253.
Heterogeneous Testicular Grafting in Man with Histologic Proof of Taking of Graft. M. Thorek, Chicago.—p. 256.
Neuropathic Dilatation of Colon with Hypertrophy. K. Winslow, Seattle.—p. 258.
Multiple Areas of Penetrating Colitis. J. F. Scott, Yakima, Wash.—p. 259.
American Red Cross Child Welfare Program in Poland. J. B. Manning, Seattle.—p. 260.

Ohio State Medical Journal, Columbus

September, 1922, **18**, No. 9

Premature Separation of Normally Implanted Placenta. W. D. Fullerton, Cleveland.—p. 596.
Case of Double Kidney and Double Ureter: Review of Literature. C. M. Harpster, T. H. Brown and H. A. Delcher, Toledo.—p. 602.
Significance of Meningeal Reactions. O Berghausen, Cincinnati.—p. 606.
Diagnosis and Interpretation of Symptoms in Cerebral Injuries. J. E. Pirrung, Cincinnati.—p. 611.
*Operability and Technic of Operation of Cerebral Traumatism. T. S. Jackson, Cleveland.—p. 614.
Occupation Dermatoses. R. Ruedemann, Jr., Cincinnati.—p. 618.
Practical Points in Treatment of Drug Habits. E. E. Gaver, Columbus.—p. 620.
Methods of Determining Astigmatism of Crystalline Lens. R. C. Heflebower, Cincinnati.—p. 623.

Operability of Cerebral Traumatism.—Jackson emphasizes the fact that no rule or blood pressure pulse rate chart which has ever been invented, can tell what to do with skull fracture case. Attempts are frequently made to formulate a syndrome which definitely indicates or contradicts operation. Some syndrome might work out correctly if constant factors were being dealt with, but variables is the rule. No two human beings are alike; no two injuries are alike and certainly similar injuries do not provoke similar reactions. Therefore, each must be treated as an entity and judgment based solely upon the individual case.

Rhode Island Medical Journal, Providence

September, 1922, **5**, No. 9

Glaucoma; Etiology and Treatment. F. J. McCabe, Providence.—p. 303.
Treatment of Chronic Rheumatism with Especial Reference to Radium. L. L. Albert, Central Falls, R. I.—p. 307.

West Virginia Medical Journal, Huntington

September, 1922, **17**, No. 3

Digitalis Therapy. G. H. Barksdale, Charleston.—p. 81.
Fluoroscopic Examination of Urinary Tract. A. L. Gray, Richmond.—p. 86.
"Lest We Forget." J. L. Miller, Thomas, W. Va.—p. 91.
Cancer Problem. F. L. Hupp, Wheeling.—p. 93.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Archives of Radiology and Electrotherapy, London

August, 1922, **27**, No. 3

Deep Therapy. Problems in Radiotherapy. R. Knox.—p. 69.
Id. S. G. Scott.—p. 87.
Id. R. Proust, L. Mallet et R. Coliez.—p. 89.

British Journal of Children's Diseases, London

July-Sept., 1922, **19**, Nos. 223-225

Effect of Special High Protein Diets in Treatment of Chronic Intestinal Indigestion in Children. A. Brown, A. M. Courtney and I. F. MacLachlan.—p. 113.
*Severe Blood Diseases of Childhood. F. J. Poynton, H. Thursfield and D. Paterson.—p. 128.

Severe Blood Diseases of Childhood.—Any sharp clinical distinction between myeloid and lymphocytic leukemia in childhood is held by Poynton, Thursfield and Paterson to be impossible, and, further, there are unusual examples in which the resemblance to cases in the group of anemia gravis (aplastic anemia) and purpura hemorrhagica is clinically very close. One point on which particular emphasis is laid by the authors is the dissimilarity of the picture of their cases of lymphocytic leukemia to that which may be gathered from descriptions in textbooks. The most severe of them have shown little or no lymphatic enlargement, and the spleen may not be felt, or at the most be detected just below the costal arch. The pathologic examinations of their cases inclines them, on the whole, to the view that the changes in the lymphoid tissues are the result of the primary damage to the bone marrow but the decision on this point is a very difficult one. Another difficult point arises in the differential leukocyte count. What percentage of lymphocytes is a test of lymphatic leukemia? The authors' experience on this point was that the relative proportion of lymphocytes tended to fall in anemia gravis as the illness progressed, but in lymphatic leukemia it tended to rise, reaching 90 per cent. or over, but this was not invariable. A great increase in the total number of leukocytes in lymphatic leukemia in this series of cases was the exception. One case showed 123,000 per c.mm., but the majority of cases gave a low count. In other words, lymphatic leukemia of the most severe kind may be associated with a leukopenia. Of eighteen cases of leukemia, fourteen were diagnosed as acute lymphatic leukemia, two as myeloid leukemia, and two were apparently of a mixed type. Two cases of myeloid leukemia, both in male infants, showed some remarkable points of differences from the lymphatic group. The spleen reached an enormous size, and the total count of white blood cells, 400,000 per c.mm., exceeded any met with in the lymphatic cases. Then, again, there were numerous myelocytes and a considerable number of nucleated red blood cells.

British Medical Journal, London

Sept. 16, 1922, **2**, No. 3220

*Significance of Retinal Hemorrhages. C. O. Hawthorne.—p. 495.
*Method of Reducing Congenital Dislocation of Hip. F. W. Goyder.—p. 497.
*Fragilitas Ossium Associated with Blue Sclerotics. Three Cases. H. Stewart.—p. 498.
Occupational Dermatitis. W. J. O'Donovan.—p. 499.
Dermatitis Artefacta. G. H. Lancashire.—p. 504.
Familial Alopecia Areata and Strabismus: Family Group of Cases. J. G. Tomkinson.—p. 505.
Roentgen-Ray Treatment of Deep-Seated Cancers. J. R. Riddell.—p. 506; J. H. D. Webster.—p. 507, and F. Hernaman-Johnson.—p. 510.
Value of Gas Inflation in Roentgen-Ray Diagnosis. F. Hernaman-Johnson.—p. 511.
Dimple on Condyle of Femur. W. K. Connell.—p. 515.
Unsuspected Pregnancy. J. Fletcher.—p. 516.
Diphtheria Carrier. C. L. Spackman.—p. 516.

Significance of Retinal Hemorrhages.—Hawthorne states that retinal hemorrhages may exist without recognized prejudice to vision, and ophthalmoscopic examination is therefore a necessary part of every clinical examination. Such hemorrhages may be the first objective signs of serious disease, and a discovery of them, therefore, demands a complete examination of the patient. The recognition of retinal hemorrhage is often of high value in directing the observer to a correct interpretation of the clinical facts, while the prognostic significance of the observation per se is indeterminate. Retinal hemorrhages do occasionally exist as isolated clinical facts, and when so existing are comparable to hemorrhages in other parts of the body (hematemesis, hematuria, hemoptysis, etc.), for which no ready explanation is at hand.

Reduction of Congenital Hip Dislocation.—Goyder effects reduction by making downward pressure on the fully flexed knee. The method adopted for the left hip is as follows: The patient's sacrum may be placed on a sandbag; the pelvis is steadied by an assistant. The knee and hip are flexed, the latter as fully as possible till the knee lies as nearly as can be managed beside the trunk. The right hand of the operator is put on the patient's knee and has two functions—first, by downward pressure to push the head toward the acetabulum, and, secondly, by rotation at the knee to direct the movements of the femoral head. The palm of the operator's left hand is placed against the great trochanter with the thumb in front and the fingers on the neck of the femur behind. While downward pressure is maintained with the right hand to keep the head of the femur as low as possible an attempt is made, by lifting with the fingers of the left hand, and depressing the right hand with or without rotation, to put the head below the acetabulum. A little time and some preliminary stretching of the tissues below the acetabulum may be needed, but no great force. The next maneuver consists in maintaining the forward position of the head while gradually relaxing the pressure on the knee when the head sinks noiselessly into the acetabulum, often at the first attempt. This done, external rotation at the hip joint brings the limb into the usual Lorenz position. The thigh should finally be approximately at right angles to the body, and the knee more dorsally placed than the pubic symphysis, so that the head of the femur is fairly prominent in the groin.

Fragilitas Ossium with Blue Sclerotics.—The points of interest in Stewart's series of cases are: (1) that the four eldest members of the family have blue sclerotics; the children of the two eldest suffer from fragilitas ossium and blue sclerotics, while the children of the third are apparently normal. The fourth sister, who died some years ago, was unmarried. (2) The great preponderance of right side fractures. (3) The leg bones are chiefly affected. (4) The first fracture in each case occurred at 2 years of age. (5) There was only one case of deficient hearing. (6) All patients with brittle bones have blue sclerotics, but several with blue sclerotics have apparently normal bones.

Edinburgh Medical Journal

September, 1922, **29**, No. 3

Treatment of Disabilities of Hand and Wrist: Anatomic Review in Relation to Function. W. A. Cochrane, Boston.—p. 97.
*Aortitis, with Special Reference to Syphilitic Aortitis. S. B. B. Campbell.—p. 109.
Variations in Respiratory Exchange with Masks of Different Types. L. Dautrebande and H. W. Davies.—p. 127.
Urethroscope as an Aid in Diagnosis and Treatment of Gonorrhea. C. C. Brown.—p. 136.
Case of Congenital Narrowing of Esophagus. K. P. Brown.—p. 145.
Case of Myositis Ossificans Progressiva in Child. J. A. Henderson.—p. 148.

Syphilitic Aortitis.—In Campbell's series of thirty-seven cases of aortitis syphilis was found to be the causal factor in thirty-one. Of these, twenty-eight gave a positive Wassermann reaction, and in the remaining three a definite history of syphilis was elicited, in one twenty years previously, and in the others twenty-six and twenty-seven years, respectively. Of the remaining six cases, one was found in a case of subacute endocarditis, while two other patients gave a definite history of rheumatic fever. Another had lived in the tropics for a long time and had a high blood pressure—220 systolic. The remaining two patients gave no definite history of any previous disease.

Journal of State Medicine, London

September, 1922, **30**, No. 9

Some of Social and Medical Gains of Industrial Legislation. T. Oliver.—p. 369.
Immediate Selfdisinfection: Its Efficacy and Advisability. H. W. Bayly.—p. 381.
Comparison of Colloid Flocculation Test (Dreyer-Ward Technic) with Wassermann Reaction for Diagnosis of Syphilitic Infection. H. J. B. Fry.—p. 396.

Journal of Tropical Medicine and Hygiene, London

Sept. 15, 1922, **25**, No. 18

*Geographical Distribution of Human Schistosomiasis. F. Milton.—p. 289.

Geographical Distribution of Human Schistosomiasis.—Human schistosomiasis, Milton says, is distributed around the world between 38 degrees N. and 36 degrees S. in a broad belt, which shows patches of peculiar intensity of infestation and other patches of still more curious freedom from all infection. In Europe the only two known endemic centers are one in Cyprus and the other in southern Portugal, and in both these centers *Schistosomum hematobium* is the only species found. The continent of Africa is preeminently the home of the schistosomes, and there is hardly a part of it in which medical work is carried on with efficiency from which cases have not been reported. However, Milton has been unable to find record of any cases originating in Algeria, Tripoli and Red Sea Coast. Both *S. hematobium* and *S. mansoni* are found in Africa, as are also cases of *S. bovis*.

Medical Journal of Australia, Sydney

Aug. 19, 1922, **2**, No. 8

Convulsions in Childhood. A. J. Turner.—p. 203.
Hay-Fever. W. N. Robertson.—p. 207.
*Peritoneal Echinococcosis; Analysis of Twenty-Five Cases. K. D. Fairley.—p. 209.
Case of Ring Sarcoma of Ciliary Body. J. L. Gibson.—p. 215.

Peritoneal Echinococcosis.—Multiple infestation was present in seventeen out of the twenty-five cases presenting multiple cysts analyzed by Fairley. Retrogressive change, often going on to calcification, was present in 20 per cent. of the cases. The clinical data in this paper entirely support the view that local implantation of hydatid elements derived from a leaking or ruptured intra-abdominal cyst, or from the dissemination of cyst contents during operative interference is the general mode of origin of multiple peritoneal echinococcosis. It was actually possible in 88.2 per cent. of the cases to prove the existence of a primary operation for intra-abdominal (usually hepatic) hydatid or to elicit the history of an acute abdominal crisis frequently following trauma which may or may not have necessitated operative intervention. Single cysts, on the other hand, probably originate by the active migration of a single embryo from the alimentary tract direct to the peritoneum or perhaps as a metastasis via the blood stream. The clinical picture of uncomplicated peritoneal hydatid is due to pressure exerted on adjacent structures and is generally characterized by the appearance of palpable cystic tumors. Single cysts are usually located in the pelvis, and early in their evolution produce pressure symptoms. Systemic manifestations occur only when some complication supervenes. Rupture or leakage of a cyst may lead to the anaphylactic syndrome, while secondary bacterial infection usually produces the clinical picture of localized intraperitoneal sepsis. Retrogressive changes are, as a rule, unassociated with features of clinical import. The preoperative diagnosis of multiple peritoneal echinococcosis has been satisfactory in this series, 88.2 per cent. of cases being correctly diagnosed. The more universal application of the Casoni intradermal test and the complement fixation reaction in abdominal tumors is urged. In peritoneal hydatid, complete removal of the cyst (including the adventitia) is the surgical ideal; where this is not possible, the adherent adventitia may have to be left in situ. Closure of the adventitia after removal of the cyst and its contents and the injection of 10 per cent. liquor formaldehyd in glycerin into the cavity yields satisfactory results. Drainage should be employed only where it is definitely indicated.

South Africa Medical Record, Cape Town

Aug. 26, 1922, **20**, No. 16

Asthma. J. Drummond.—p. 302.
Interpretation of Wassermann Reaction. W. A. Murray.—p. 306.
Tubular Skin-Grafting. M. G. Pearson.—p. 309.
*Unusual Cause of Danger in Puerperium. C. Lundie.—p. 311.
Two Cases of Polycystic Kidney. H. A. Moffat.—p. 312.
Undulant (Malta) Fever in South Africa. Appeal for Study and for Recognition of Its Chronic Forms. D. P. Marais.—p. 313.

Extreme Nervousness Causes Syncope in Puerperium.—Lundie cites the case of a woman pregnant with her seventh child who was, from the third month, unusually nervous about her coming confinement, which she would not survive. The result was that she suffered from severe syncopal attacks during the pregnancy and even for several days after confinement which was accomplished in ten minutes under general anesthesia. The author is convinced that the origin of the syncope was an undue nervous stimulation of the heart.

Tubercle, London

September, 1922, **3**, No. 12

*What Are Dangers of Infection for Children Under Eight in Tuberculous Homes. T. Schram, Christiania.—p. 529.
Heliotherapy. C. H. Brown.—p. 537.
Presence and Quantity of Ethereal Sulphates in Urine of Tuberculous Patients and Relation Which They Bear to Degree of Pyrexia. N. D. Ball.—p. 540.
Sun Treatment as Aid to Open-Air Treatment of Surgical or Nonpulmonary Tuberculosis. T. H. Martin.—p. 544.

Dangers of Infection for Children in Tuberculous Homes.—Five hundred children between the ages 0 and 8, and recruited from 310 tuberculous homes were examined by Schram by means of Pirquet's cutaneous tuberculin test to show what risks of infection are run by children in such homes. It was found that children in tuberculous families, living under bad housing conditions, run a very great risk of infection which is greatest when the disease of the source of infection is most advanced. In such homes infection occurs early, more than half the children being infected before they are a year old. Effective isolation of the tuberculous in homes containing young children is not feasible even when the patient is given a bedroom to himself. The child should be protected from massive infections, either by removing the source of infection from the child's neighborhood, or by isolating the child.

Archives des Maladies de l'App. Digestif, Paris

March, 1922, **12**, No. 2

*Linear Gastric Ulcer. G. Lion.—p. 73.
*Acute Dilatation of Stomach. Arnozan and R. Damade.—p. 99.
Diverticulum in Lower Duodenum. M. Robineau and Gally.—p. 103.
*Syphilitic Gastric Ulcer. A. Cade and Morenas.—p. 109.
Multiple Tumors in Esophagus. L. Timbal.—p. 126.

Linear Gastric Ulcer.—Lion's illustrations show the long fissure in the stomach caused by the linear ulceration in three cases. It was like a long slit in the stomach wall, and its extent compelled gastrectomy. In one case perforation was impending and in another case there was malignant degeneration of the tissues in the depths of the fissure. The resection of the stomach was difficult on account of the length of the linear ulceration but in one case in which merely gastroenterostomy had been done, gastrectomy became necessary later.

Complications of Acute Dilatation of the Stomach.—The elderly woman was healthy except for occasional indigestion from dietary indiscretions and the swallowing of air. One day the aerophagia became extreme and acute dilatation of the stomach followed, with hypersecretion. Spasm of the pylorus complicated the clinical picture, and there was blood in vomit and stools. Conditions gradually righted themselves and there has been no further disturbance since. The retrospective diagnosis explains the bleeding as due to some laceration of the gastric mucosa from the extreme dilatation. The recovery excludes ulceration.

Syphilitic Gastric Ulcer.—Cade and Morenas state that the character of the vascular lesions underlying these ulcers explains the scant benefit from specific treatment. It should be given a trial, but if it fails, surgical measures should be considered. The syphilitic basis should be suspected when the pains in the stomach do not correspond to the usual periods with gastric ulcer, and there is no hyperchlorhydria. Bleeding from the ulcer is common and may be profuse, possibly fatal.

Gynécologie et Obstétrique, Paris

July, 1922, **6**, No. 1

*Nomenclature for Dystocia. E. Zarate.—p. 1.
*Dystocia from Pelvic Anomalies. J. Rhenter.—p. 10.
Successful Vaccine Therapy in Case of Puerperal Pyemia. Dantin.—p. 37.
*Phrenic Reaction in Genital Infection. C. Stajano.—p. 44.

Necessity for Uniform Nomenclature for Dystocia.—Zarate queries whether there is any definite type of dystocia for

which the contraction or retraction of the uterine muscle fibers are directly responsible. "Dystocia from contracture of Bandl's ring"; "acute antepartum hour-glass uterus" and two dozen or more other terms have been applied to this form of dystocia, but the clinical picture is the same in all: There is a stricture of the uterus, and the dystocia is annular. This is the only muscular form of dystocia that can be accepted as a pathologic entity.

Experiences with Contracted Pelvis.—Rhenter relates that some pelvic lesion compelled special measures in 387 of the 19,588 maternity cases at the Lyons clinic. The total mortality was 0.41 per cent., and 1.5 per cent. in this abnormal pelvis group. The fetal mortality in the institutional births was 11.6 per cent. Premature delivery was induced in 169 cases and it proceeded spontaneously in 75 per cent. No woman has died from this intervention during the last fourteen years in this group of spontaneous deliveries, and the morbidity was only 3.5 per cent.; the fetal mortality was 10.9 per cent. Cesarean section is given the preference when the pelvis is so contracted that the probabilities are against the spontaneous delivery of a child weighing at least 2,300 gm. By bringing the head in contact with the superior inlet, the proportion between the diameters can be estimated. By repeating this maneuver from time to time it is possible to judge when the limit of free passage is about to be surpassed. If the conjugate diameter is at least 8 or 8.5 cm., according to the shape of the pelvis, and if the fetus is at least 8 months old, then delivery may be rationally induced immediately.

Phrenic Reaction to Genital Infection.—Stajano calls attention to symptoms in the upper abdomen which may at first simulate gallbladder disease, liver colic, or perforation of an ulcer, but which is merely the reaction of the diaphragm to a gonococcus or streptococcus process in the female genital organs. It subsides harmlessly as the genital lesion continues its course. This phrenic reaction, as he calls it, may be observed also after an operation on some active process at which numerous adhesions were broken up. This reaction is rare with tuberculous lesions. Intraperitoneal hemorrhage is also liable to induce this reaction, but it is not observed with old encysted salpingitis with only slight involvement of the peritoneum. The reaction is the result of congestion in the peritoneum or of subperitoneal lymphangitis. The region responds with pain and tender points along the costal arch and phrenic nerve, and a sharp pain in the diaphragm, increased by deep breathing. There may be vomiting, singultus and a dry spasmodic cough from spasm of the irritated diaphragm. But all is transient and yields promptly to wet cupping at the costal arch. In the region between the genital organs and the phrenic nerve domain the nerves lie deeper, and are better protected, so that they escape the irritation; it passes harmlessly over them to the region above where it elicits the pains and tenderness, possibly even before the primary pelvis lesions have attracted attention.

Lyon Chirurgical

July-August, 1922, **19**, No. 4

*Mechanism of Surgical Elephantiasis. W. S. Halsted, Reichert and Mont-Reid.—p. 369.
*Retro-Omental Pseudocyst. G. Bolognesi.—p. 377.
Rupture from Contusion of Loop in Hernia. G. Bolognesi.—p. 380.
Cyst in Frontal Sinus. F. J. Collet.—p. 384.
*Meningitis After Intraspinal Anesthesia. P. Wertheimer.—p. 387.

Infection as Responsible for Surgical Elephantiasis.—The research described here has been repeatedly mentioned in THE JOURNAL, as on page 1446, Oct. 29, 1921. In the latest experimental work to determine the mechanism of surgical elephantiasis, entire limbs were transplanted.

Retro-Omental Pseudocyst.—The epigastric tumor in the epileptic young man had developed rapidly. The supposed cyst was opened and sutured to the abdominal wall after evacuating 6 liters of the effusion. Intercurrent pneumonia proved fatal, and necropsy showed that an effusion had collected back of the omentum to form a false cyst as the hiatus of Winslow became closed.

Aseptic Meningitis After Intraspinal Anesthesia.—The patient was a man of 27, and the acute aseptic puriform meningitis developed twenty-four hours after the intraspinal injection done by the routine technic and with the solution used safely in other cases. The symptoms and continuous fever persisted for thirteen days. The intense headache was not relieved even by repeated lumbar puncture, but prompt improvement followed an intravenous injection of a 30 per cent. solution of glucose. The toxic congestive leptomeningitis in this case was particularly severe, the symptoms from intracranial hypertension being scarcely modified by lumbar puncture. A second injection of the strong glucose solution banished the last signs of irritation of the meninges.

Progrès Médical, Paris

Aug. 5, 1922, **37**, No. 31

*Intra-Uterine Tamponing with Placenta Praevia. G. Ribas.—p. 361.
*Benign Monoplegic Tetanus and Tetanoid Spasms. E. Chauvin and P. Vigne.—p. 362.
Acute Appendicitis with Slow and Irregular Pulse. A. Broca.—p. 363.
Syphilis and Metrorrhagia. Dalché.—p. 364.
Insufficient Development of Abdominal Viscera in Insane Person. H. Damaye.—p. 367.

Intra-Uterine Tamponing in Treatment of Hemorrhage Due to Abnormal Insertion of Placenta.—Ribas says that this method of tamponing is not mentioned in any obstetrical textbooks although it is of great value in stopping hemorrhage occurring in the last months of pregnancy and also in provoking delivery. It is better than the inflatable bag because it does not require the rupture of the membranes. The gauze is between the internal wall of the uterus and the external part of the placenta and membranes. In cases where the life of the mother was at stake, the hemorrhage stopped in a few hours and spontaneous delivery occurred. He describes with an illustration the use of the tampon, and states that if expulsion does not occur in ten or twelve hours, a second tamponing should be done; as a rule, expulsion soon follows. He adds that if the tampon is applied slowly and cautiously, no complications need be feared.

Benign Monoplegic Tetanus and Tetanoid Spasms.—Chauvin and Vigne report that a laboratory worker cut her forefinger on a broken, clean test tube, and after the cut had healed in a week, developed painful spasms in the hand and forearm. At any touch of the hand the contractions returned. They grew more frequent and severe, with slight but distinct trismus. They injected two mild doses of antitetanus serum, 10 c.c. each, and the spasms decreased, and finally disappeared completely. They are convinced that it was a case of tetanus, but in the absence of trismus, they would have hesitated to diagnose tetanus. They query whether certain posttraumatic tetanoid spasms should not be considered as atypical forms of tetanus bacillus infection.

Schweizerische medizinische Wochenschrift, Basel

Aug. 31, 1922, **52**, No. 35

*Prophylaxis of Goiter. F. de Quervain.—p. 857.
*Iodin Prophylaxis of Goiter. M. E. Bircher.—p. 862.
*Bacteriology of Epidemic Encephalitis. R. Doerr and W. Berger.—p. 862.
Brine Baths in Gynecology. H. Keller.—p. 866.
Vaccine Therapy in Osteomyelitis. A. v. Beust.—p. 869.

The Thyroid and Iodin in Relation to Prophylaxis of Goiter.—De Quervain's article was read at the meeting of the Swiss goiter commission. (The resolutions adopted were reported in THE JOURNAL, September 2, p. 834.) He agrees with Hunziker that goiter represents the way in which the thyroid adapts itself to an inadequate supply of iodin in the food. But he urges that as the thyroid is found abnormally large in all the infant cadavers in the Swiss goiter centers, and as he found, himself, that fully 75 per cent. of all the children entering school for the first time at Berne have appreciably enlarged thyroids, prophylaxis must begin before the school age. To be effectual, it must be begun with the mother, and this is practicable only with iodized salt. The aim must be to prevent goiter in the rising generation. He warns that the dose of iodin in the salt must be below the dose that is active in adults, also that the school prophylaxis must be kept at the lower limit of effectual action, and that children approaching puberty must be excluded from these prophylactic measures at any signs of even slight overfunctioning of the thyroid.

Scientific Control of Iodin Treatment.—Bircher insists that the behavior of the thyroid can be gaged with comparative precision by the basal metabolism. This should be the guide for treatment with iodin. Any exaggeration of the basal metabolism forbids iodin. He has encountered a number of cases of grave injury from iodin treatment without this scientific control. He adds that next spring there is to be a conference on goiter at Basel at which American physicians will take a prominent part. "They are coming to Switzerland," he says, "to study goiter. They have nothing to learn from Swiss physicians in regard to goiter."

Epidemic Encephalitis and Herpes.—Doerr and Berger report that they have succeeded in isolating two new strains of epidemic encephalitis virus from the brains of two persons who had died from the disease, one a physician. One of the strains could be used for cross-immunization with herpes virus, confirming Doerr's previous experiences in this line.

Annali d'Igiene, Rome

February, 1922, **32**, No. 2

The Intestinal Cholera of Young Animals. G. Sanarelli.—p. 117.

March, 1922, **32**, No. 3

Experimental Poisoning with Maize. P. Ramoino.—p. 201.
Behavior of True and False Diphtheria Bacilli in Bile Mediums. G. Rigobello.—p. 208.
Diphtheria Bacilli in Urine in Diphtheria. E. Petriccioni.—p. 212.
*Hygienic Drinking Fountain from Pail. A. del Bue.—p. 218.

Bubble Drinking Fountain from Pail.—Del Bue gives illustrations of a simple siphon device which can be attached to any tank or pail. Pressing the faucet turns on a little fountain in the basin below.

May, 1922, **32**, No. 5

Intestinal Cholera in Puppies. G. Sanarelli.—p. 349.
Staining of Spores. A. Alessandrini.—p. 362.
*Improved Stain for Tubercle Bacilli. A. Luisi.—p. 367.
Starvation Edema. G. Fracassi.—p. 371.

Stain for Tubercle Bacilli.—Luisi declares that the method he describes gives better preparations and shows up larger numbers of the bacilli than with any other technic. The specimen is treated for fifteen seconds with a hot saturated aqueous solution of crystal violet, to which is added at the moment of using 3 or 4 drops of a 5 per cent. solution of phenol. The decoloration is with 40 per cent. nitric acid for one instant only. The contrast stain is a saturated aqueous solution of Orange G. The specimen is left in this for half a minute.

June, 1922, **32**, No. 6

*Aid from Cattle in the Fight Against Malaria. B. Grassi.—p. 421.
Experimental Spirochetal Jaundice in Goats. G. Ghetti.—p. 513.

New Horizons in Prophylaxis of Malaria.—Grassi discusses in particular the part played by domestic animals in attracting the mosquitoes away from man. He queries whether certain anopheles bite man in preference to animals or the reverse, and whether certain animals attract them most. After biting one species, do they pass to another or not? In any event, he regards it as established that intensive stock raising is bound to aid materially in diverting the mosquitoes away from man to the animals. Draining and screening must be supplemented by large stocks of cattle or other animals. Patton's endorsement of the advantages of a tame white cow to attract mosquitoes and gnats and serve for their collection was mentioned editorially, Sept. 30, 1922, p. 1150.

Policlinico, Rome

Aug. 7, 1922, **29**, No. 32

*Recent Tendencies in Roentgenology. G. Nicolich.—p. 1033.
Fatal Case of Spirochetal Jaundice. V. Vanni.—p. 1038.
Syphilitic Disease of Liver. F. Viola.—p. 1040.
*Permanent Stains for Bacteria. G. Reina.—p. 1043.

Recent Tendencies in Roentgen Treatment.—Nicolich reviews the later publications on roentgen treatment of the urinary apparatus, and states that in reviewing records of 686 operative cases of tumor of the bladder, mostly cancer, he found only one instance of perforation into the rectum, and this was dubious. He compares this with the two cases of perforation into the rectum in a recent series of twelve bladder tumors given roentgen-ray treatment, and deduces that the irradiation must have been responsible for the perforation.

Durable Stain for Bacteria.—Reina reports that photographic developing methods applied to bacteria seem to produce slides that do not fade.

Aug. 14, 1922, **29**, No. 33

Serodiagnosis of Syphilis. E. Trenti.—p. 1065.
*Blister Autoserotherapy in Tuberculosis. G. Ronco.—p. 1073.
*Treatment of Pyelitis. A. Cassuto.—p. 1075.
Maggots in Vulvar Abscess. G. Jacobucci.—p. 1077.

Blister Autoserotherapy.—In the tuberculous, very little and only transient benefit followed a course of injections of fluid from a blister on the patient's back, and this only in the early stages. In some acute nontuberculous affections, considerable improvement followed. This was striking in one case of grave rebellious trigeminal neuralgia.

Pyelitis.—Cassuto has been gratified with the benefit that followed intravenous treatment of pyelitis with hexamethylenamin plus neo-arsphenamin.

Brazil-Medico, Rio de Janeiro

July 8, 1922, **2**, No. 27

*The Resistance of the Blood Capillaries. Silva Mello.—p. 17.
Plague in Northeastern Brazil. A. Gavião Gonzaga.—p. 19.
Teaching of Hygiene in the Primary Schools. Carlos Sá.—p. 21.

Capillary Resistance in Diagnosis.—Silva Mello gives an illustrated description of his little suction apparatus applied to the forearm. Minute intradermic hemorrhages form in the skin under the vacuum cup when the reaction is positive, showing abnormal permeability of the capillary walls.

July 15, 1922, **2**, No. 28

Radiologic Diagnosis of Tuberculosis. F. Munk.—p. 33.
Paul's Rabbit Eye Test for Smallpox. J. M. Gomes.—p. 35.
Technic for Direct Esophagoscopy. S. Cezar da Silva.—p. 36.

July 29, 1922, **2**, No. 30

*Treatment of Staphylococcus Infections. J. Monjardino.—p. 57.
Prophylaxis of Leprosy. I. Vernet.—p. 61.

Aug. 5, 1922, **2**, No. 31

Structure and Evolution of Tubercle Bacillus. A. Fontes.—p. 71.
Bacteriophagia and Bacteriolysis in Snake Poisons. J. Lemos Monteiro.—p. 72.
Vegetables in Infant Feeding. J. P. Fontenelle.—p. 75.
New Bismuth and Arsenical Preparations for Treating Syphilis. Pomaret.—p. 76.

Treatment of Staphylococcus Infections.—Monjardino reports some typical cases which confirm anew the benefit from total excision of the infectious focus. They demonstrate likewise the tendency to prompt and almost complete repair after a staphylococcus lesion. In one case excision of a carbuncle left a huge breach which promptly healed and filled up. In another case the entire shaft of the tibia was necrotic in the child of 3. The bone regenerated perfectly, without any shortening of the limb, after excision of 15 cm. of the shaft. The periosteum tube bridged the gap.

Siglo Médico, Madrid

July 8, 1922, **70**, No. 3578

Ramón y Cajal. C. M. Cortezo.—p. 49. Cont'n.
*Fatal Ileus Ascribed to Trendelenburg Position. Carrasco.—p. 33.
The Leukocyte Reactions in Typhus. B. Fuejo.—p. 35. Conc'n No. 3580, p. 86.

Torsion of Intestine After Trendelenburg Position.—Carrasco does not hesitate to ascribe the fatal ileus in the woman of 43 to the consequences of the Trendelenburg position. It had been applied during abdominal hysterectomy for a bleeding fibromyoma in the uterus. The fourth day afterward the symptoms of ileus developed suddenly and proved fatal. Necropsy revealed that the colon had looped on itself, at the left angle, closing the lumen. He declares that Trendelenburg himself has warned against raising the pelvis in operating on the obese. This woman had borne ten children in twenty years.

Archiv für Verdauungs-Krankheiten, etc., Berlin

July, 1922, **30**, No. 2

*Gallstones and Migraine. G. Kelling.—p. 59.
*Chronic Ulcerative Gastritis; Two Cases. A. Borgbjärg.—p. 73.

*Influence on Abdominal Walls of Breathing. Hausmann.—p. 85.
Operative Treatment in Case of Dilatation of Cecum and Colon with Ptosis, Dyspepsia and Gastralgia. H. Illoway (New York).—p. 105.

Relations Between Cholelithiasis and Migraine.—Kelling warns that when colic pains return after an operation for gallstones, before a new operation is contemplated the possibility of the disturbances being an abdominal form of migraine must be weighed well. Migraine is frequently found accompanying cholelithiasis. They both develop on the same soil, and obesity is also common in these subjects. Sluggish metabolism of fat seems to be a factor in all; and fat foods and those rich in cholesterin should be avoided in all, especially eggs, butter and cream. If oil is used in treatment of gallstones it should be oil with the lowest melting point, and it is better to refrain from it altogether unless the patient is thin. He orders lean meat for obese gallstone patients, to promote the flow of bile, and he has noticed that in many patients a tendency to migraine was improved thereby. He recalls that animals which are carnivorous have to display more ingenuity and patience in obtaining their food than the animals that feed on plants. This and other data cited seem to suggest some connection between the carnivorous mode of life and the development of the brain. Lean meat in the diet seemed to have a favorable influence in many cases of migraine and stomach disturbances of the migraine type, and in cases of brain fag. He noted this particularly in working girls who spend their wages on clothes instead of nourishing food.

Ulcerative Gastritis.—Borgbjärg describes two cases of what he calls gastritis chronica gravis in men of 36 and 58. Symptoms had been observed for about a year, with continuous twelve hour retention and hypersecretion in one, and achylia in the other case. On suspicion of cancer the stomach was resected, but nothing was found except the gastritis and numerous microscopic superficial ulcers in the mucosa. Both men seemed to be cured completely by the resection.

Breathing in Relation to Palpation.—Hausmann describes how to utilize to the utmost the mechanical effect of different modes of breathing as an aid in "scientific palpatology."

Deutsches Archiv für klinische Medizin, Leipzig

July 25, 1922, **140**, No. 1-2

*German Medicine in the Nineteenth Century and Since. B. Naunyn.—p. 1.
*Cholesterin Protects Against Infections. E. Leupold and L. Bogendörfer.—p. 28.
*Velocity of Blood Stream. E. Koch.—p. 39.
Case of Intermittent Auricular Tachysystolia K. Kure and S. Sakai.—p. 67.
Extrasystoles with Ventricle Automatism. E. Weiser.—p. 73.
*Record of Movements of Eyes. E. Schott.—p. 79.
*Volume Bolometry. H. Sahli.—p. 91.
To Hasten Coagulation of Blood. K. Addicks.—p. 117.

A Century of Medicine in Germany.—Naunyn's historical review is of the type of "All of which I saw, and part of which I was." He emphasizes Virchow's influence on the development of the hospital system in Germany and thus around the world. When Virchow at 23 was prosector at the Berlin Charité, the provisions for his work were meager indeed, but by the time he died, the leading hospital, at least, in every large city had a well equipped institute for pathologic anatomy. Naunyn ascribes the birth of *specialistenthum* to the year 1840. Neurology and pediatrics were the first specialties taught. Ophthalmology sprang to birth like Minerva, fully grown, thanks to the ophthalmoscope.

Significance of Cholesterin in Infections.—The details are tabulated from twenty cases of infectious diseases repeatedly tested for the cholesterin content of the blood. It showed a pronounced decline during the infection but it rose during convalescence, sometimes to a figure above normal. This and other facts noted suggest that cholesterin has a protecting action against bacteria. Mice, guinea-pigs, rats and rabbits were given cholesterin in their food for three or four weeks. Then various groups were inoculated with different bacteria. All the cholesterin-treated animals either failed to develop infection or the animals survived much longer than the controls. The cholesterin content of the blood rose to much above normal in the cholesterin-treated animals. It does not seem to promote phagocytosis; its protecting action lies in its faculty of binding bacterial toxins. As it binds and renders the toxin harmless, it is lost to the blood. The outcome of the disease seems to depend on the amount of cholesterin available.

Velocity of the Blood Stream.—Koch estimates this by injecting a stain into one arm while the blood is dripping from the corresponding vein in the other arm. Every five seconds the escaping blood is examined for the first appearance of the stain. In 68 healthy women and 51 healthy men the interval was 20.8 seconds in the former and 20.7 in the latter. In 19 patients with circulatory disturbances, the interval was nearly three times as long, the range being from 30 to 63 seconds. Of the 7 patients with an interval over 50, 6 died within a few weeks. The stain he uses is a mixture of 2 parts of fluorescein and 4 parts of sodium bicarbonate, with distilled water to 120 parts. About 1 c.c. is injected into a vein at the bend of the elbow. A delay in the appearance of the stain in the other arm is an early sign of incipient insufficiency of the circulation. This stain test is simple and harmless, he says, and can be repeated at will. His tables show the findings in 5 diabetics, 5 pneumonia patients, 13 convalescents, 6 with polycythemia, leukemia or pernicious anemia, 9 with the high blood pressure of kidney disease, and other groups, to a total of 400 applications of the test.

Registration of Nystagmus.—Schott applies the filament galvanometer to record the movements of the eyes.

Volume Bolometry.—Sahli epitomizes his research in estimation of the energy of the pulse wave, and presents experimental testimony to sustain his law of the ratio between the pulse and the caliber of the artery.

Deutsche medizinische Wochenschrift, Berlin

July 28, 1922, **48**, No. 30

Differential Diagnosis of Affections of the Gallbladder and the Digestive Tract. M. Einhorn (New York).—p. 997.
*Virulence of Saprophytes. Heymann and Strauss.—p. 999. Idem. Lange.—p. 1000.
Studies on Tuberculosis. Igersheimer and Schlossberger.—p. 1001.
*The Prognosis in Leukemia. F. Klewitz and E. Schuster.—p. 1003.
Treatment of Ordinary Fracture of Radius. Sonntag.—p. 1003.
Sigmoid Flexure Incarcerated in Slit in Mesentery. Schäfer.—p. 1006.
Theory of the So-Called Endothelium Symptom. E. Vogt.—p. 1007.
Relation of the Chemism of the Organism to Tetany. Orgler.—p. 1008.
Inhibition of the Gruber-Widal Reaction by Measles. W. Forche.—p. 1010.
Injuries of the Spinal Cord. G. Ledderhose.—p. 1013.
Treatment of Phimosis and Paraphimosis. L. Casper.—p. 1016.

Increasing the Virulence of Acid-Fast Saprophytes by Repeated Passage Through Animals.—Heymann and Strauss, and also Lange, reach the conclusion that an increase in the virulence of acid-fast saprophytes is not brought about by repeated passages through animals.

The Prognosis in Leukemia.—Klewitz and Schuster found that roentgen irradiation does not prolong the life of leukemic patients to any considerable extent, but they emphasize most emphatically that roentgen irradiation if begun early will do much toward keeping the patient in a condition in which he can work and remain self-supporting. The therapeutic results are purely symptomatic and not permanent.

Deutsche Zeitschrift für Chirurgie, Leipzig

July, 1922, **172**, No. 5-6

*Transactions of the Bavarian Surgical Society.—pp. 285 to 437.

Transactions of Surgical Meeting.—The twenty-seven communications presented at the recent annual meeting of the surgeons of Bavaria are published in full, accompanied by the discussions. Ten of the papers are summarized herewith.

By-Effects of Nerve Blocking.—König has applied injection anesthesia in 37 per cent. of the total anesthesia cases in his service. There were no fatalities for which the local or regional anesthesia could be held responsible, but the frequent cardiovascular disturbances and other by-effects confirm that it does not do away with the dangers inherent in general anesthesia. In short, he adds, injection anesthesia as a whole "is still in the leading-strings stage"—*noch in den Kinderschuhen steckt.*

Mishaps with Intraspinal Anesthesia.—In 1907 Strauss had compiled 22,717 cases in which intraspinal (lumbar) anesthesia had been applied, with a mortality of 1:2534. Since

then he has compiled records of 83,698 cases, with mortality of 1:5978. He regards it as the only method for certain operations in diabetes, severe arteriosclerosis, cachexia, ileus, strangulated hernia, and for hard drinkers. One great advantage is that it dispenses with the necessity for a reliable assistant at the operation.

Goiter.—Von Eiselsberg remarks that there are few experiences which the surgeon can regard with so much satisfaction as his successful operations for exophthalmic goiter. In his 215 operative cases of exophthalmic goiter, the mortality was 3.7 per cent., but at first he operated only in the severest cases; 3 of the 8 fatalities were in the first 4 he operated on. He insists on several days of repose and calcium lactate to prepare for the operation to resect the thyroid. If tetany develops and proves refractory to calcium salts and chloral, parathyroid grafts from children dying during delivery or from fatal accident cases may tide the patient along until his own accessory parathyroids can assume the functional task. The grafts are always absorbed in time. Sauerbruch reported excellent results from parathyroid grafts in the rectus muscle in 3 cases of postoperative tetany. Capelle reported 32 cases of postoperative tetany. It developed in 1.3 per cent. after ligation of two arteries; in 1.9 after three arteries had been ligated, and in 4.4 per cent. after ligation of four arteries, and the severer forms were all in this latter group. He thinks that this demonstrates that the tetany resulted from some interference with the nourishment of the parathyroids. As this corrected itself in time, the tetany subsided; it had disappeared partially or entirely in all his cases when the patients were dismissed. Before operating in exophthalmic goiter, Krecke insists on bed rest for several weeks and roentgen exposures of the thymus. He has never had tetany develop after an operation for recurring goiter although in one case five operations had been required. In Madlener's 93 cases in which he ligated four arteries, there was partial necrosis in one case of what had been left of the thyroid, and in another case fatal tetany. His experience has convinced him that, in districts far from the ocean, minute doses of iodin are necessary for the young, to a total of 0.1 gm. of potassium iodid during the year.

Pyocyaneus Cultures in Treatment of Erysipelas.—Ledderhose noticed that when green pus developed in an infectious process, the process began to heal at once. This was repeatedly observed with erysipelas, and he began to treat the latter systematically with cultures of the micro-organism inducing the blue-green pus, namely, the pyocyaneus. The success was complete, he says, in the eight cases treated, but he warns not to attempt this treatment for young children or the much debilitated, or when the erysipelas is the manifestation of general sepsis. He has never seen any harm result.

Nodular Rheumatism.—Port refers to that form of rheumatism in which small and tender lumps can be palpated in certain muscles and at certain accessible points in joints. When a joint is affected, movements are painful and the pain is local, but when a muscle is involved, the pain spreads to a distance. There may be headache when the muscles of the back of the neck are affected; pains in the arm and weakness of the hand with the shoulder muscles, or in the leg with the hip muscles involved. Direct pressure on one of the nodules elicits sharp pain. The disturbances appear like ordinary rheumatism after getting chilled or in bleak weather. The symptoms can be promptly cured by massage, seeking out the lumps and kneading them between the fingers. He adds that the knowledge of these lumps and their special treatment is the secret of Swedish massage. This nodular rheumatism has been taught in Sweden for decades. Arvedson in Stockholm gives special postgraduate courses in it. Port has found these nodules in children between 8 and 12, often associated with headache from the extension of the process to the muscles of the back of the neck, especially with scoliosis at any age, and invariably when trauma or overexertion is assumed as the cause of the scoliosis. The sudden onset of pains first attracts attention to the anomaly of the spine, but both the rheumatism and the curvature had long existed. He adds that scoliosis is often aggravated and the curvature fastened by a muscular contraction, like that with flatfoot. Bed rest in one case loosened up the spine to such a degree that the child became 10 cm. taller. The muscles will usually be found tender in such cases.

Gastric Hemorrhage After Gastro-Enterostomy.—Krecke remarks that besides the danger of cancer later, of peptic ulcer and of perforation when intervention is restricted to a gastro-enterostomy, we must consider the danger of hemorrhage. He has had hemorrhage occur in almost 8 per cent. of his 152 cases of gastro-enterostomy in the last twenty years, and 5 died from the hemorrhage of the 11 in this group. In 2 of the other cases the ulcer was resected before the hemorrhage returned. The hemorrhage occurred the day of the operation or the following in all but 2 cases; in these there was an interval of ten days, and the patients succumbed the next day.

Total Gastrectomy for Cancer.—Kreuter reports a case which brings to forty-four the number of cases on record in which the excised organ showed esophagus tissue at one end and duodenal tissue at the other, testifying that the entire stomach had been removed. His patient died the third day, and necropsy revealed that the upper loop of the jejunum had become kinked and incarcerated back of the esophagojejunostomy. Possibly this mishap might have been avoided by joining the esophagus and jejunum together back of the colon. The case is instructive on account of the severe shock that followed immediately after the ninety-five minute operation. He ascribes it to the temporary ligation of the esophagus and its accompanying vagi. In such cases the vagi should be supervised with special care.

Total Resection of Large Intestine.—The woman of 27, a nurse in an asylum for idiots and epileptics, was tormented for years by pains and blood in the stools after a contusion of the left abdomen. The large intestine was finally resected from the ascending colon to the sigmoid flexure. Disturbances returned in a few years, and the ascending colon was resected. This answered the purpose for several years, but return of symptoms compelled resection of the cecum also. The lowest loop of the small intestine was joined to the upper end of the rectum. The health has been perfect during the nearly two years since, with full earning capacity and no tendency to diarrhea. The entire large intestine can thus be dispensed with, without impairing the general health.

Ligation of Splenic Artery.—Stubenrauch states that ligation of the splenic artery seems to answer all the purposes of splenectomy in treatment of blood disease. At least this is his impression from a case described in which a man of 66, previously healthy, developed a hemorrhagic tendency along with symptoms of gout. The bleeding was from the kidneys, bowel and skin, and the anemia was extreme. The vascular system and internal organs seemed normal, but the blood showed scarcely any platelets. The day after ligation of the splenic artery through a median incision, leaving the vein unmolested, the platelets were found in normal numbers, and a month later they were exceptionally abundant. There have been no hemorrhages during the seven months since the operation but the platelets are now scanty once more. This same experience has followed splenectomy, so that a durable result can never be counted on. Haberer mentioned that he had ligated the splenic artery in three cases in the course of gastrectomy and no untoward by-effects had been observed. The ligation must be central from the vasa brevia to insure collateral circulation. His three patients are living. Necrosis of the spleen develops when the artery is ligated close to the hilus, below the openings in the vasa brevia.

Testicle Implants.—Kreuter remarks that microscopic examination later of a transplanted testicle is the only way to determine the actual facts in regard to gonad grafts, instead of merely subjective impressions. He knows of only one report of this kind (Rössle), but has had an opportunity himself in two cases to remove an implanted testicle three weeks and two years after the grafting operation. Complete necrosis of the reproductive elements and extreme reduction of the interstitial cells was found in the testicle removed in three weeks. In the other case, the ingrafted testicle had been totally absorbed in the course of the two years. His experience teaches that grafting an undescended testicle from a

heterosexual subject in a homosexual subject who has had one testicle removed, has no effect on the homosexual impulses. In another experience, a homosexual testicle implanted after total castration in a sexually normal individual did not display any influence on the sexual impulses.

Medizinische Klinik, Berlin

July 2, 1922, **18**, No. 27

*Scurvy in Berlin Adults. Umber.—p. 851.
*Vaginal Cesarean Section. A. Dührssen.—p. 852.
The Constitution From the Clinical Standpoint. L. Borchardt.—p. 856.
*Peptic Ulcer. K. Brandenburg et al.—p. 859.
Case of Premature Puberty with Epidemic Encephalitis. F. Stern.—p. 864.
Calcium Treatment in Rhinology. G. Wotzilka.—p. 867.
Turbidity Seroreaction in Syphilis. H. Sachs and F. Georgi.—p. 868.
Treatment of Rickets. K. Blühdorn.—p. 871.
*The Puberty Gland. C. Hart.—p. 873.

Scurvy in Adults.—Umber remarks that during the fifty-eight years of the existence of the Berlin Medical Society, no report on scurvy in adults has ever been presented except one describing scurvy in an exploring expedition at the antipodes. These remarks were preliminary to his report of nine cases of scurvy observed recently at Berlin. The correct diagnosis had not been made in any instance before they reached the hospital. The severe manifestations, persisting for weeks disappeared like dew before the sun when the lacking accessory food factors were supplied in the form of fresh vegetables or fruits or pine needles. A cup of pine needle tea, three times a day, answered the purpose perfectly, and was taken with relish. The jumping-jack sign was found in all the cases, that is, the jerking upward of the shoulder and arm on sudden pressure of the calf. The hemorrhages in the muscles, especially those of the calf, induce painful infiltration which is often mistaken for a phlegmon. He adds that in two of the cases the scurvy developed in the hospital, the long cooking of the foods in porridge form for the regular hospital diet being the last straw that brought on the scurvy in persons long living without vitamins.

Vaginal Cesarean Section.—Dührssen recalls that obstetrics is now in its fourth great period. The first epoch was that of podalic version; it extended from Celsus to the end of the sixteenth century; then the forceps epoch; then the classic cesarean section period, and finally, the period since 1895 in which extraperitoneal cesarean section has dominated. In 1889 Dührssen published articles on the importance of incising the cervix or the vagina and perineum, or severing the levator ani on one side. The deep incision in the cervix requires the supravaginal portion of the cervix to be completely dilated. When this is the case, there is no danger of the incision tearing farther and bleeding. Four incisions are usually necessary. If each incision is made between two clamps, there is no hemorrhage. It is not necessary to suture the incisions. He introduced vaginal cesarean section in 1896, and declares that this solved a problem which had been debated for 2,000 years. It allows the child to be extracted at any moment during the pregnancy or labor, regardless of whether or not the cervix is dilated. This median incision is carried through the rectovaginal septum up close to the rectum, and in the vagina far enough up for the fist to be introduced to the fornix. As all the muscles and fascia of the floor of the pelvis join here in the septum, and thus hold the floor of the pelvis taut, dividing the septum in the middle separates the floor of the pelvis into two halves. These retract, and there is no further obstacle to delivery. There is less bleeding than from severing the levator ani, and the triangular raw surface can be easily sutured with a continuous catgut suture.

Peptic Ulcer.—This is a collective inquiry in regard to pathogenesis, differential diagnosis, treatment, and prognosis. Kuttner, Finsterer and Peiper give their views in detail. Kuttner mentions that any statistics on the healing and duration of healing of peptic ulcers are unreliable, as there may be recurrence after years of latency. Even resection does not guarantee a complete cure, as the predisposition to ulcer persists. The more frequently peptic ulcers are given operative treatment, the larger the number returning with pains, vomiting, hemorrhage and other disturbances. Operations are done on nervous girls and women or those with chlorosis, which should contraindicate such operations. Another cause of failure is the wrong choice of the operative measure, or lack of care in the diet afterward, especially overloading the stomach. Thorough internal treatment before and after the operation is indispensable. Finsterer operates at once with acute hemorrhage from an ulcer, and states that all were cured of the fifteen treated by resection within twenty-four or forty-eight hours, while one died of the three treated by gastro-enterostomy alone, a mortality of 5.5 per cent. of the total eighteen. In thirty-one with an interval longer than this, nine died, that is, 29 per cent. The mortality with internal treatment of acute hemorrhage from an ulcer is from 26 to 47 per cent. In deciding on operative treatment, if the patient lives near a large hospital, temporizing is less dangerous than when long transportation would be necessary in case of acute hemorrhage. He says that in his latest series of sixty-five resections for gastric ulcer, the mortality was 3 per cent., and only 1.5 per cent. in 129 resections for duodenal ulcer. In twenty-five peptic ulcer resections, the mortality was 4 per cent. In his total 320 resections for ulcer there was no death from postoperative pneumonia. He reports an instance of pains and hemorrhage from duodenal ulcer, with peptic ulcer later, in two brothers; both were treated by resection on three occasions, removing more and more of the stomach each time. When only a small stump was left, all disturbances were permanently cured for the first time in the men of 44 and 42. This experience teaches that the cure depends on extensive removal of the stomach. His mortality after resection is no higher than others report after gastro-enterostomy while the ultimate outcome is incomparably better. No instance of cancer later is known in his cases. He resects as much of the lesser curvature as possible, preferably by the "steps" method and the Billroth II, leaving a little depression just below the point of the anastomosis to prevent overprecipitate evacuation.

The Puberty Gland.—Hart's long review of the literature on this subject seems to establish the untenability of Steinach's conception of the puberty gland and the interstitial cells. The latter seem to be concerned only in storing up nourishment for the reproductive cells proper.

Münchener medizinische Wochenschrift, Munich

July 21, 1922, **69**, No. 29

Kidneys Have No Internal Secretion? W. von Möllendorff.—p. 1069.
Chronic Joint Affections and Their Treatment. E. Plate.—p. 1072.
*Irradiation of Spleen for Genital Hemorrhage. O. Wolmershäuser and H. Eufinger.—p. 1077.
The Action of Carbonated Baths. W. Arnoldi.—p. 1078.
A New Type of Orthopercussion. O. Geiger.—p. 1080.
*High Blood Pressure During the Climacteric. F. Kisch.—p. 1082.
*Own Urine Vaccine in Pyelocystitis. A. Adam.—p. 1084.
Chronic Dysenteric Cholecystitis. Tscherning.—p. 1085.
A Cardiac Diverticulum in a Congenital Abdominal Hernia. W. Weber.—p. 1085.
Regulations Governing Handling of Disease-Producing Agents. W. Rimpau.—p. 1087.
The New Roentgen Equipment of the Würzburg University Surgical Clinic. E. Schrader.—p. 1089.
*The Early Diagnosis of Pararenal Abscess. A. Krecke.—p. 1090.

Irradiation of the Spleen in Hemorrhage of the Reproductive Organs.—Wolmershäuser and Eufinger think that irradiation of the spleen, if the indications are carefully considered, gives excellent results in a large number of hemorrhages of the genital organs—cases in which old forms of treatment met with little success.

High Blood Pressure in Relation to the Menopause.—Kisch found in 39 cases of premature menopause only one case with constantly high blood pressure for which some outside special cause could not be established clinically. In 3 cases, chronic nephritis, albuminuria or aortal insufficiency was responsible. In 16 cases, the systolic blood pressure and also the pulse pressure showed extreme fluctuations, high blood pressure sometimes alternating with normal values; nor were these fluctuations dependent on exercise, diet or ingestion of liquids. In 19 cases, the blood pressure was normal. Of 253 women, ranging in age from 42 to 52, who were passing through the climacteric, 138 were found to have a normal blood pressure; that is, at most a systolic pressure of 140 mm. of mercury. Although 61 of these 253 women presented a constant elevated

blood pressure (above 140 mm.), definite outside causes were discovered in all but 3 cases. Kisch therefore concludes that if high blood pressure exists during the climacteric other outside causes should be suspected, as he does not find that the assumption of hypertonia as being due to a reduction of ovarian functioning is justified.

Own Urine Vaccines in Pyelocystitis.—Adam prepares an autogenous vaccine from the urine by the following simple technic: He takes a thick-walled test tube with a tight-fitting rubber stopper. These are sterilized by boiling. With a catheter he draws 10 c.c. of urine and transfers it to the test tube. The uper edge of the tube is sterilized over a flame. When the tube has cooled the stopper is inserted. After twenty-four hours usually, although sometimes forty-eight hours are required, the tube being kept at a temperature of from 20 to 37 C., bacterial growth will be noted. Five drops of chloroform and 0.5 c.c. of a 5 per cent. phenol solution are now added, the tube is shaken vigorously and then, after the lapse of twenty-four hours, the vaccine is ready for use. Before the contents of the tube are removed, it should be again shaken and a few minutes allowed, to precipitate the undissolved chloroform. He began with an injection of 0.1 c.c. and increased the amount from day to day by 0.1 c.c., until a marked local reaction in the form of a welt 2 c.c. in diameter appeared. The next injection was not given until all signs of the first had disappeared, which usually took three or four days. He never injected more than from 0.5 to 1.0 c.c. of vaccine. In the eight cases (all children) in which he has tried the method the results were excellent. He uses the method at present only in refractory cases in which salol and hexamethylenamin have proved of no avail. As it is a question of active immunization, it seemed best to exclude cachectic children and those suffering from severe disturbances of nutrition.

The Early Diagnosis of Pararenal Abscess.—Krecke emphasizes: (1) the sudden beginning of the affection with febrile symptoms and pains in the loin region; (2) circumscribed muscle tension, swelling and sensitiveness in either the left or right loin region, associated with severe general symptoms, with absence of any changes in the urine, and (3) history of a suppurative focus in some other part of the body (furuncle). If these signs and symptoms are present, a correct diagnosis may be reached during the first few days, and a timely incision will often save the patient a long sickness and protect him against the dangers associated with a deep-seated suppuration.

Zeitschrift für Kinderheilkunde, Berlin

July 20, 1922, **33**, No. 1-2

*Concentrated Milk for Infants. T. Ide and E. Nobel.—p. 1.
*Albumin Milk. H. Hochschild.—p. 24.
*Epinephrin Hyperglycemia in Infants. H. Beumer and F. Schäfer.—p. 34.
Length of Sojourn in Infant Intestine. W. Kahn.—p. 48.
Hypoplasia of Skeleton as Sequel of Juvenile Arthritis Deformans. S. Eliakim.—p. 55.
Standards for Normal Development of Hand. St. Engel and E. Runge.—p. 61.
*Water Content of Blood. E. Grunewald and E. Rominger.—p. 65.
*Ferment Content of Infant Stomach. E. Mengert.—p. 85.
*Injury of Infants from Heat. E. Nobel.—p. 96.
*Enuresis and Tuberculosis. H. Langer.—p. 108.
Mongoloid Idiocy in Mongol Infant. F. Demuth.—p. 110.

Concentrated Milk in Infant Feeding.—The water in the milk is evaporated by boiling or in a vacuum, and the milk is thus reduced to 50 or 33 per cent. of its volume. This concentrated milk was given to 202 new-born infants and thirty older ones, to a total of 302 periods of from three to twelve days. The findings on this food are tabulated although the method has scarcely more than scientific interest except for the prematurely born. For them, concentrated breast milk might offer advantages.

Albumin Milk in Infant Feeding.—Hochschild has been studying the behavior of the capillaries and intestinal putrefaction in infants on albumin milk. This gives a new standpoint for estimating its action, and means to render it more effectual.

Epinephrin Hyperglycemia in Infants.—The research reported shows that the sugar content of an infant's blood rises with any intake of sugar of any kind. The findings after injection of epinephrin may thus be obscured by sugar in the food. Calcium chlorid seems to sensitize the sympathetic to epinephrin, so the response to epinephrin is intensified. With spasmophilia and tetany, a subnormal glycemic reaction to epinephrin indicates hypotonia of the sympathetic system from calcium deficit.

Water Content of Blood.—A daily variation was evident, the blood being more concentrated at evening in all the children and adults tested. Muscular exertion may be responsible for this. In infants, the water content varies irregularly.

Ferment Content in Infant Stomach.—Mengert found invariably that the digestive ferments were in the same relative proportions in the infant stomach as in adults.

Injury of Infants from Heat.—Nobel tabulates the clinical findings and course in fifteen infants under treatment for disturbances from excessively warm weather. Two thirds of them died, and a catarrhal affection of the intestines was found at each necropsy. In the large intestine it had progressed to actual ulceration. Two of the children had keratomalacia. Reduction of intake of food below the minimum had a favorable influence, even in the severe cases. He reiterates that it must never be forgotten that extreme heat, even in children who are thriving, reduces the tolerance for food.

Enuresis.—Langer refers to Pototzky's camphor treatment of enuresis as great progress, but adds that it does not apply to all cases. He has been impressed with the frequent coincidence of tuberculosis, and reports that a course of tuberculin treatment has rendered good service in such cases.

Zentralblatt für Chirurgie, Leipzig

May 27, 1922, **49**, No. 21

*Active Epithelization of Wound Surfaces. K. Reschke.—p. 730.
*Diagnosis of Ileus. R. Höfer.—p. 733.
Irradiation of Spleen in Relation to Coagulation of the Blood. O. Wassertrüdinger.—p. 734.
Correction of an Artificial Anus. W. von Reyher.—p. 737.
Inguinal Hernia in Relation to the Bladder. H. Flörcken.—p. 738.
The Bellocq Catheter. A. Neudörfer.—p. 740.
Loose Bodies of Traumatic Origin in Knee Joint Causing Trigger Joint. F. Linde.—p. 741.
Incision for Ligation of Anterior Tibial Artery. R. Spanne..—p. 745.

Active Epithelization of Wound Surfaces by the Pels-Leusden Method.—Reschke states that after the manner of the Mangoldt procedure, epithelium is reduced to a pulpous condition and is injected into the granulations. A special type of metal syringe is used for the purpose. The epithelium is usually taken from the skin of the thigh but often from the vicinity of the wound. The horny layer of the skin is scraped off with an ordinary surgical knife. As the process of abrading is continued, blood and serum appear and, mixing with the epithelium of the deeper layers, a soft, pulpous mass is formed. This pulp is transferred to the syringe as fast as it is scraped up with the knife. One should not allow too much air to be mixed with the pulp. When as much epithelial pulp has been secured as is needed to cover the wound surface in question, the needle is screwed in firmly and the pulp is injected into the granulations either in many islands or in narrow parallel channels. The pulp may be injected into smeary wound surfaces, and it is astonishing to see how quickly these are changed into ideal granulating surfaces. The rapid spontaneous cleansing of the wound surface is doubtless due to the blood serum contained in the pulp. The time that elapses before the islands of epithelium appear on the wound surface will depend on how deeply the pulp was injected. The epithelial islands seem to be attracted to the edge of the wound and also to each other. Reschke regards it as a great advantage of the method that smeary surfaces may receive the injections without any previous preparation. The certainty of healing and the good quality of the new skin are two main features of the method. As compared with the Thiersch flap method, it has the advantage of leaving no scar where the new tissue is secured. The method is applicable to all granulating wound surfaces and to line a cavity in a bone. Whether the method is adaptable to the covering of amputation stumps or to restore skin defects over joint

surfaces, must be learned by further trials, but, in view of the thickness and pliability of the newly formed skin, it looks very promising.

The Diagnosis of Ileus.—Höfer recounts a method that he uses to discover the cause and seat of intestinal obstruction—the auscultatory phenomenon of the aortic pulse audible over the abdomen. Since first establishing the finding, he has examined all his ileus cases with this object in view and was able in every case to evoke the same results. He noted further that, after elimination of the ileus through operative or internal measures, the symptom could no longer be elicited. Three recent cases were especially significant. In one case there was acute intestinal occlusion associated with tuberculosis of the peritoneum. The aortic pulse was audible over the whole abdomen. After an enema had opened up the intestinal passage, the symptom could no longer be demonstrated. In a second case of acute ileus, the history awakened the suspicion of a tumor of the upper large intestine as the cause. The aortic pulse could be heard only over the right lower abdominal region. Operation revealed an isolated accumulation of flatus in the cecum and an occluding carcinoma of the transverse colon. Höfer thinks that the intestinal loops filled with gas and fluid constitute especially good sound conductors which transmit to the ear the pulsation of the abdominal aorta.

June 3, 1922, **40**, No. 22

Treatment of Varicose Veins. G. Lotheissen.—p. 778.
Closure of Duodenal Fistula After Stomach Resection. Kelling.—p. 779.
Extra-Articular Arthrodesis, Including the Henle-Albee Operation in Tuberculosis of Joints. A. Nussbaum.—p. 780.
*Regenerative Capacity of Ascending Colon. F. de Gironcoli.—p. 782.
Albee Operation in Tuberculous Spondylitis. Görres.—p. 784.
Singultus in Prostatic Retention of Urine. Schoen.—p. 785.

Regenerative Capacity of Ascending Colon. — Gironcoli emphasizes, from his observations, the tendency of the colon not only to fill out defects but also to replace functionally lost portions by others; it being clearly evident that the cecum is one of the most important portions of the digestive tract as regards the normal functioning of the digestive process. He describes an instructive case of this functional adaptation after resection of ileum and cecum.

Zentralblatt für Gynäkologie, Leipzig

May 20, 1922, **46**, No. 20

*The Kielland Forceps and the Practitioner. Hoffmann.—p. 786.
*Birth Control in Families with Amaurotic Idiocy. E. Sachs.—p. 789.
Ovarian Varicocele. R. Jahreiss.—p. 795.
The New-Born of the War Period. M. Dávid.—p. 795.
The Therapeutic and Prophylactic Local Injection of Quinin in Inflammation of Nipple. Kritzler.—p. 802.

The Kielland Forceps.—Hoffmann reports that since he has been using the Kielland forceps he has not found it necessary in any case to use any other. Not only that; in certain cases he has been able to accomplish results which, to judge from previous experiences, would have been impossible with other forceps.

A Case of Idiopathic Amaurotic Idiocy.—Sachs discusses the question whether a physician should advise the parents of a first child suffering from amaurotic idiocy to prevent further conception for fear children born later would develop the same disease. He reaches the conclusion that such advice, if children were desired, would be unjustifiable. He thinks, however, that it is the duty of the physician to warn the parents of the possibility of other children presenting the same disease, assuring them also that it is quite possible that healthy children may be born. His compilation of published cases shows in less than twenty families forty-four healthy brothers and sisters of the thirty-three children with the Tay-Sachs amaurotic family idiocy. Only one instance is known in which the child lived to be 10 years old, and this was not a typical case.

May 27, 1922, **46**, No. 21

Hypnosis in Obstetrics and Gynecology. E. Siemerling.—p. 834.
Childbirth under Hypnosis and Hypnonarcosis. Kirstein.—p. 843.
*Phlorizin Glycosuria in Diagnosis of Pregnancy. B. Zondek.—p. 851.
Is "Hypomochlion" (Fulcrum) as a Term in the Mechanism of Childbirth Justified? H. Meyer-Rüegg.—p. 853.
*Significance of Physiologic Ascites in Women. J. Novak.—p. 854.
Two Sets of Triplets. A. Uthmöller.—p. 859.

Phlorizin Glycosuria in Early Diagnosis of Pregnancy.—Zondek states that in the first weeks of pregnancy a change in carbohydrate metabolism appears which finds its expression in an increased tendency to alimentary and phlorizin glycosuria. Induced glycosuria can, therefore, be utilized as an early indication of pregnancy. If, after injection of 2 mg. of phlorizin, no glycosuria appears, pregnancy can be excluded with a high degree of probability. One cannot expect too much from the method. It has all the sources of error that characterize any biologic method.

Cause and Significance of Physiologic Ascites in Women.—Novak has been investigating the cause of the collection of free fluid that he so commonly found in the peritoneum of women but does not recall ever observing in men. He endeavored to ascertain whether it had any bearing on the sexual physiology of women. He selected 33 cases in which there was no apparent reason for peritoneal exudation—no signs of an inflammatory condition; only old adhesions as evidence of former inflammatory processes, but which could not be the cause of a collection of fluid. Of these 33 cases 21 showed a free fluid in the abdominal cavity. Further investigation revealed the fact that in the cases with ascites a corpus luteum in an early stage of development was found, whereas, in the 12 cases without the collection of fluid, a corpus luteum was either absent or in an advanced stage of development. In the former, either a recently ruptured follicle with blood-filled cavity or a prominent, dark-red or orange colored corpus luteum, bleeding slightly, was noted. The assumption seems therefore justified that the freshly ruptured follicle and the recent corpus luteum exert a stimulating or irritating effect on the peritoneum and bring about the effusion. Various considerations lead Novak to believe that this effusion of fluid plays an important rôle in the transmission of the ovum to the tube and in its migration along the tube.

Hospitalstidende, Copenhagen

July 26, 1922, **65**, No. 30

*Cancer in Relation to Trauma and Tuberculosis. K. Isager.—p. 481. Conc'n No. 31, p. 497.

Trauma and Tuberculosis in Relation to Cancer.—Isager reviews the antecedents in 116 cases of cancer. He calls attention in particular to the surprisingly large number in which a cancer developed a few months to a year after a shock or contusion although the trauma had not directly affected the organ in which the malignant disease developed. In 2 of the 11 cases in this group the interval had been nine and eleven years, but in the 9 others less than a year had elapsed, and this proportion is too large to be ascribed to mere coincidence. In six families, both parents had cancer and some of the 20 children were tuberculous. In only 7 of his total cancer cases had pulmonary tuberculosis preceded the cancer, and there has been no recurrence during the five to seven years since the operation in 3 out of 5 in which operative measures were feasible. None of his gouty patients have ever developed cancer. A favorable influence on cancers, especially sarcomas, from an intercurrent acute febrile infection has often been recorded. The assumption that a chronic infection like tuberculosis might have a certain inhibiting or arresting influence on malignant disease is plausible. It might prove instructive to apply the tuberculin test to cancer patients and compare the response with the course of the cancer.

Aug. 9, 1922, **65**, No. 32

*Functional Psychoses in the Elderly. J. C. Smith.—p. 513.

Psychoses in the Elderly.—In the three cases described by Smith the functional psychoses presented certain features apparently stamping them as of organic origin. This was disproved by the recovery, the retrospective diagnosis being a senile psychosis plus hysteria.

Aug. 16, 1922, **65**, No. 33

*Capacity of the Lungs. IV. C. Lundsgaard and K. Schierbeck.—p. 529.
Acoustic Phenomenon That May Aid the Blind. E. Sylvest.—p. 540.

The Capacity of the Lungs.—This is the fourth communication on this subject by Lundsgaard and Schierbeck. They discuss here the conditions in this respect with pulmonary emphysema.